

No. 25-1087

IN THE UNITED STATES COURT OF APPEALS
FOR THE DISTRICT OF COLUMBIA CIRCUIT

IN RE:

CENTER FOR BIOLOGICAL DIVERSITY, PEOPLE FOR PROTECTING
PEACE RIVER, BAYOU CITY WATERKEEPER, HEALTHY GULF,
MANASOTA-88, PORTNEUF RESOURCE COUNCIL, RISE ST. JAMES
LOUISIANA, SIERRA CLUB, WATERKEEPER ALLIANCE, and
WATERKEEPERS FLORIDA,

Petitioners.

**APPENDIX OF ATTACHMENTS IN SUPPORT OF
PETITION FOR WRIT OF MANDAMUS**

VOLUME 4 of 7

RACHAEL CURRAN
D.C. Cir. Bar # 65500
JACLYN LOPEZ
DC Cir. Bar # 62797
Jacobs Public Interest Law Clinic for
Democracy and the Environment,
Stetson University College of Law
1401 61st Street S.
Gulfport, FL 33707
(727) 490-9190
jmlopez@law.stetson.edu
727-537-0802
rcurran1@law.stetson.edu

RAGAN WHITLOCK
D.C. Cir. Bar # 65341
Center for Biological Diversity
P.O. Box 2155,
St. Petersburg, FL 33731
(727) 426-3653
rwhitlock@biologicaldiversity.org

Attorneys for Petitioners

Table of Contents

Volume 1		
Attachment No.	Document Title	Appendix Page Nos.
1	Declaration of Shannon Ansley in Support of Petition for Writ of Mandamus	APPX ATT_V1_1–5
2	Declaration of Kira Barrera in Support of Petition for Writ of Mandamus	APPX ATT_V1_6–17
3	Declaration of Martha Collins in Support of Petition for Writ of Mandamus	APPX ATT_V1_18–22
4	Declaration of Sharon Lavigne in Support of Petition for Writ of Mandamus	APPX ATT_V1_23–26
5	Declaration of Daniel Estrin in Support of Petition for Writ of Mandamus	APPX ATT_V1_27–34
6	Declaration of William Maturro in Support of Petition for Writ of Mandamus	APPX ATT_V1_35–44
7	Declaration of Andre Mele in Support of Petition for Writ of Mandamus	APPX ATT_V1_45–52
8	Declaration of Dustin Pack in Support of Petition for Writ of Mandamus	APPX ATT_V1_53–60
9	Declaration of Kristen Schlemmer in Support of Petition for Writ of Mandamus	APPX ATT_V1_61–67
10	Declaration of Gale Tedhams in Support of Petition for Writ of Mandamus	APPX ATT_V1_68–74

11	Protecting Peace River & Center for Biological Diversity, <i>Petition for Rulemaking Pursuant to Section 7004(A) of the Resource Conservation and Recovery Act; Section 21 of the Toxic Substances Control Act; and Section 553 of the Administrative Procedure Act Concerning the Regulation of Phosphogypsum and Process Wastewater from Phosphoric Acid Production</i> (Feb. 8, 2021)	APPX ATT_V1_75–130
12	Letter to People for Protecting Peace River & Center for Biological Diversity from EPA re: TSCA Petition Denial (May 6, 2021)	APPX ATT_V1_131–132
13	Center for Biological Diversity, Notice of Intent to Sue for Failure to Perform a Nondiscretionary Duty under the Resource Conservation and Recovery Act (Apr. 15, 2024)	APPX ATT_V1_133–153
14	EPA, <i>Potential Uses of Phosphogypsum and Associated Risks – Background Information Document</i> (May 1992)	APPX ATT_V1_154–269

Volume 2		
Attachment No.	Document Title	Appendix Page Nos.
15	EPA, <i>Report to Congress on Special Wastes from Mineral Processing – Summary and Findings Methods and Analyses Appendix</i> (July 1990)	APPX ATT_V2_270–910

Volume 3		
Attachment No.	Document Title	Appendix Page Nos.
16	EPA, <i>TENORM: Fertilizer and Fertilizer Production Wastes</i>	APPX ATT_V3_911–915
17	EPA, <i>Supplemental Information on Phosphoric Acid Production: Alternative Management of Process Wastewater at Phosphoric Acid Facilities</i> (Dec. 1990)	APPX ATT_V3_916–1127
18	Final Regulatory Determination for Special Wastes from Mineral Processing (Mining Waste Exclusion), 56 Fed. Reg. 27300 (June 13, 1991) (“1991 Bevill Determination”)	APPX ATT_V3_1128–1159
19	EPA, <i>Risks Posed by Bevill Wastes</i> (1997)	APPX ATT_V3_1160–1177
20	Mosaic Company 2022 SEC Form 8-K (Feb. 22, 2023)	APPX ATT_V3_1178–1210
21	Mosaic Company 2023 SEC Form 8-K (Feb. 21, 2024)	APPX ATT_V3_1211–1243
22	Nutrien Annual Report 2022	APPX ATT_V3_1244–1387
23	Nutrien Annual Report 2023	APPX ATT_V3_1388–1539

Volume 4		
Attachment No.	Document Title	Appendix Page Nos.
24	Forbes, <i>Profile: Simplot Family</i>	APPX ATT_V4_1540–1541
25	The Fertilizer Institute, Revised Request for Approval of Additional Uses of Phosphogypsum Pursuant to 40 C.F.R. § 61.206 (Apr. 7, 2020)	APPX ATT_V4_1542–1605
26	Petition for Rulemaking Under TSCA; Reasons for Agency Response; Denial of Requested	APPX ATT_V4_1606–1610

	Rulemaking, 86 Fed Reg. 27546 (May 21, 2021)	
27	Complaint (ECF 1), <i>USA v. Mosaic Fertilizer</i> , No. 15-cv-2286-JDW TBM (M.D. Fla.) (Sept. 30, 2015)	APPX ATT_V4_1611–1708
28	Consent Decree (ECF 2) and Appendix 2 (ECF 3-1) (Excerpt), <i>USA v. Mosaic Fertilizer</i> , No. 15-cv-2286-JDW-TBM (M.D. Fla.) (Sept. 30, 2015)	APPX ATT_V4_1709–1793
29	Consent Decree (ECF 2-1), <i>USA v. Mosaic Fertilizer</i> , No. 15-cv-4889 (E.D. La.) (Sept. 30, 2015)	APPX ATT_V4_1794–1878
30	Mosaic Green Bay Notice of Reactivation (July 22, 2021)	APPX ATT_V4_1879
31	Christopher O'Donnell, <i>Mosaic plant sinkhole dumps 215 million gallons of reprocessed water into Floridan Aquifer</i> , Tampa Bay Times (Sept. 16, 2016)	APPX ATT_V4_1880–1882
32	Mosaic Fertilizer, New Wales Facility, Phase IV Gypsum Stac Extension - FDEP Construction / Operation Permit Application and Supporting Engineering Report, Vol. 1, Sec. 1 (Feb. 15, 2024)	APPX ATT_V4_1883–1960
33	Jaclyn Lopez, <i>EPA's Opportunity to Reverse the Fertilizer Industry's Environmental Injustices</i> , 52 ELR 10125-10152 (2022)	APPX ATT_V4_1961–1988
34	EPA 2023 Biennial National Hazardous Waste Report Summary	APPX ATT_V4_1989–1992
35	Emergency Final Order, <i>In Re: HRK Holdings, L.L.C.'s a.k.a Eastport Terminal</i> , OGC File No. 21-0323 (Mar. 29, 2021)	APPX ATT_V4_1993–2002

Volume 5		
Attachment No.	Document Title	Appendix Page Nos.
36	Bethany Barnes et al., <i>Failure at Piney Point: Florida let environmental risk fester despite warnings</i> , Tampa Bay Times (Apr. 17, 2021)	APPX ATT_V5_2003–2016
37	Florida Executive Order No. 21-82 (Apr. 3, 2021)	APPX ATT_V5_2017–2025
38	Marcus W. Beck et al., <i>Initial estuarine response to inorganic nutrient inputs from a legacy mining facility adjacent to Tampa Bay, Florida</i> , 178 Marine Pollution Bull. 113598 (2022)	APPX ATT_V5_2026–2040
39	Conservation Organizations' Comment Letter to DEP Drinking Water and Aquifer Protection Program re: Piney Point UIC Permit (Oct. 6, 2021)	APPX ATT_V5_2041–2058
40	Elise S. Morrison et al., <i>The response of Tampa Bay to a legacy mining nutrient release in the year following the event</i> , 11 Front. Ecol. Evol. 1144778 (2023)	APPX ATT_V5_2059–2075
41	Lauren M. Johnson, <i>A large red tide has contributed to more than 600 tons of dead marine life in Florida</i> , CNN (July 19, 2021)	APPX ATT_V5_2076–2078
42	FDEP Wastewater Compliance Inspection Report for Mosaic Fertilizer New Wales Concentrates Plant (Oct. 21, 2023)	APPX ATT_V5_2079–2083
43	Letter from Ardaman & Associates, on behalf of Mosaic Fertilizer, to FDEP re: Confirmed Critical Condition at Area of	APPX ATT_V5_2084–2087

	Interest 4 (Dec. 14, 2023)	
44	Louisiana Department of Environmental Quality (LDEQ), Public Notice: Mosaic Fertilizer LLC – Uncle Sam Plant, Gypsum Management Area and Appurtenances, Public Hearing and Request for Public Comment on a Draft Solid Waste Permit Renewal & the Associated Environmental Assessment Statement (EAS) (2024)	APPX ATT_V5_2088–2089
45	Notice of Approval for Other Use of Phosphogypsum, 89 Fed. Reg. 104353 (Dec. 23, 2024)	APPX ATT_V5_2090–2091
46	Approval of the Request for Other Use of Phosphogypsum by the Fertilizer Institute, 85 Fed. Reg. 66550 (Oct. 20, 2020)	APPX ATT_V5_2092–2094
47	Withdrawal of Approval for Use of Phosphogypsum in Road Construction, 86 Fed. Reg. 35795 (Jul. 7, 2021)	APPX ATT_V5_2095
48	Mosaic Fertilizer, LLC – Riverview Facility Initial Application to Construct Class I Injection Well System, Hillsborough County (Oct. 17, 2023)	APPX ATT_V5_2096–2152
49	Mosaic Fertilizer, LLC – New Wales Facility Initial Application to Construct Class V Exploratory Injection Well, Polk County (Feb. 16, 2024)	APPX ATT_V5_2153–2203
50	Mosaic Fertilizer, LLC – Green Bay Bartow Facilities Initial Application to Construct Class V Exploratory Injection Well, Polk County	APPX ATT_V5_2204–2253

51	FDEP, Notice of Draft Permit for Mosaic Class V Exploratory Well, Plant City, Florida (Nov. 22, 2024)	APPX ATT_V5_2254–2283
52	Ethan Huang, <i>Why Seas are Rising Faster on the Southeast Coast</i> , NASA Sea Level Change Portal (June 6, 2023)	APPX ATT_V5_2284–2286
53	Jeff Berardelli, <i>How climate change is making hurricanes more dangerous</i> , Yale Climate Connections (July 8, 2019)	APPX ATT_V5_2287–2294
54	Karthik Balaguru et al., <i>Increased U.S. coastal hurricane risk under climate change</i> , 9 Sci. Adv. 9 (2016)	APPX ATT_V5_2295–2305
55	Email from Mosaic to FDEP re: 5-Day Follow-Up Report on Phosphogypsum Pollution During Hurricane Milton (Oct. 15, 2024)	APPX ATT_V5_2306–2308
56	J. P. Hughes et al., <i>Evaluation and synthesis of health effects studies of communities surrounding arsenic producing industries</i> , 17(2) Int. J. Epidemiol. 407–413 (1988)	APPX ATT_V5_2309–2315

Volume 6		
Attachment No.	Document Title	Appendix Page Nos.
57	U.S. HHS, Agency for Toxic Substances and Disease Registry, <i>Toxicological Profile for Lead</i> (Aug. 2020)	APPX ATT_V6_2316–2898
58	U.S. HHS, Agency for Toxic Substances and Disease Registry, <i>Toxicological Profile for Selenium</i> (Sept. 2003)	APPX ATT_V6_2899–3355
59	U.S. HHS, Agency for Toxic Substances and Disease Registry,	APPX ATT_V6_3356–3841

	<i>Toxicological Profile for Cadmium</i> (Sept. 2012)	
60	U.S. HHS, Agency for Toxic Substances and Disease Registry, <i>Toxicological Profile for Chromium</i> (Sept. 2012)	APPX ATT_V6_3842–4432

Volume 7		
Attachment No.	Document Title	Appendix Page Nos.
61	EPA, <i>Health Risks of Radon</i>	APPX ATT_V7_4433–4444
62	National Emission Standards for Hazardous Air Pollutants; Radionuclides, 54 Fed. Reg 51654 (Dec. 15, 1989)	APPX ATT_V7_4445–4507
63	Lesley Fleischman & Marcus Franklin, <i>Fumes Across the Fence Line: The Health Impacts of Air Pollution from Oil & Gas Facilities on African American Communities</i> , NAACP Clean Air Task Force (2017)	APPX ATT_V7_4508–4543
64	EPA, EJScreen Community Report – Progress Village, FL (Jan. 17, 2024)	APPX ATT_V7_4544–4547
65	EPA, <i>Petitions to the Office of Land and Emergency Management</i>	APPX ATT_V7_4548–4557

F PROFILE

Simplot family

\$11.1B 2024 America's Richest Families Net Worth
as of 2/8/24**F** | From the Editor

- J.R. Simplot (d. 2008) amassed a fortune in potatoes. He dropped out of 8th grade in Idaho, worked odd jobs and then bought his own potato farm.
- His J.R. Simplot Company created the first commercially viable frozen French fries in the 1940s and became the exclusive supplier to McDonald's.
- The \$9.8 billion (2023 estimated sales) business is still one of the world's biggest fry producers and has expanded into phosphate mining and fertilizers.
- Five Simplot family members are on the privately held company's board. J.R.'s son Scott is the chairman and previously served as chief executive.



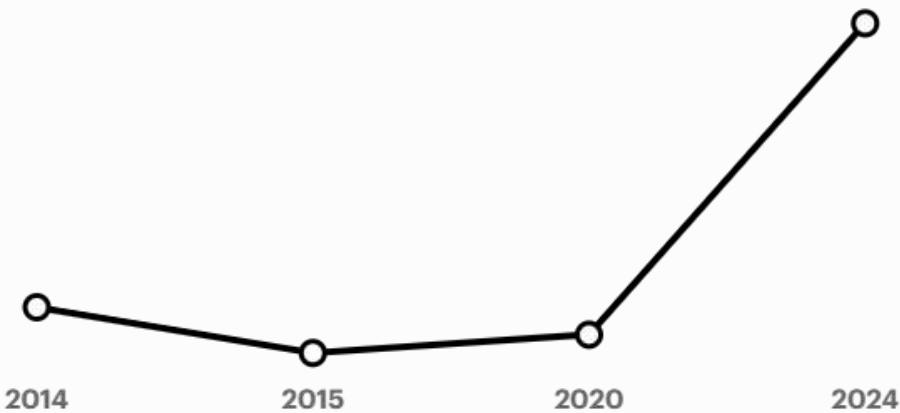
ALSO ON FORBES

'Suits LA' And 'Grosse Pointe Garden Society' Plummet In Week 2 On NBC

Senate Democrats Tell N.Y. State Bar To Investigate Trump's Deputy AG For Dropping Eric Adams Charges

Wealth History

HOVER TO REVEAL NET WORTH BY YEAR



Forbes Lists

#40

America's Richest Families (2024)

Personal Stats

Fortune Founded

1929

Source of Wealth

agribusiness

Company Headquarters

Boise, Idaho

Related People & Companies

- Liu Hanyuan

Related by origin of wealth: agribusiness

View Profile →
- Liu Yonghao & family

Related by origin of wealth: agribusiness

View Profile →
- Xue Hua

Related by origin of wealth: agribusiness

View Profile →
- Xu Yingzhuo

Related by origin of wealth: agribusiness

View Profile →
- Shao Genhuo

Related by origin of wealth: agribusiness

View Profile →

Nashville To Broadcast First-Ever Live
'Songwriters Round' To Theater
Audiences Nationwide

**IN THE UNITED STATES ENVIRONMENTAL
PROTECTION AGENCY**

**REVISED REQUEST FOR APPROVAL OF ADDITIONAL USES
OF PHOSPHOGYPSUM PURSUANT TO 40 C.F.R. § 61.206**

Use in Road Construction projects authorized by federal, state and local
Departments of Transportation or Public Works

Submitted by: **The Fertilizer Institute on Behalf of Its Members**

Andrew (Andy) T. O'Hare, CAE
Vice President, Public Policy
The Fertilizer Institute
425 Third Street, SW, Suite 950
Washington, DC 20024
(202) 515-2704 (office)

CONTENTS

This Petition and supporting risk analysis were developed by reviewing the “Applying to EPA for Approval of Other Uses of Phosphogypsum: Preparing and Submitting a Complete Petition under 40 CFR 61.206, A Workbook” (EPA PG Workbook) and prior petitions, and through a series of working meetings with EPA staff to obtain EPA input and direction on key elements of the analysis. Throughout this process, the methodologies and technical issues utilized in the technical evaluations were informed by EPA’s feedback.

This Petition includes the following sections:

Section	Description
Preamble	Key Definitions
I	Overview
II	Petition Request and Legal Review Process
III	Regulatory History and Recent Developments
IV	Summary of Supporting Scientific Information
V	Application of Risk Management Factors to use of PG in road construction
Attachment A	Reference Road Construction Specifications

This Petition is supported by the following information:

Appendix	Description
Appendix 1	Summary of the Risk Assessment and Metals Screening Report (same as October 2019 Petition submission)
Appendix 2	Radiological Risk Assessment in Support of Petition for Beneficial Use of Phosphogypsum (same as October 2019 Petition submission)
Appendix 3	Human Health Risk Screening for Metals and Metalloids
Appendix 4	4a: Response to EPA Comments on January 16, 2020 and 4b: Responses to Second Set of USEPA Questions on March 6, 2020 – Reclaimer
Appendix 5	Report on recent measurements of PG radioactivity level in U.S. stacks
Appendix 6	Policy Navigation Group, Economic Analysis of Phosphogypsum Reuse (December 2019)
Appendix 7	Location of PG stacks (mailing address for the Petitioners is the TFI address on the Petition cover and the addresses in Appendix 7)

Appendix 8	Other documents being submitted for the administrative record
------------	---

DEFINITION OF KEY TERMS

The basic concepts relevant to this Petition are:

Dose: Dose measures the amount of radiation absorbed by a person. The terms radiation absorbed dose (rad) and gray (Gy) describe measurements of the absorbed dose.

1 gray (Gy) is equivalent to 100 rad; 1 rad = 0.01 Gy

Dose equivalent adjusts the absorbed dose to include the relative medical effects of gamma rays, alpha or beta particles, x-rays, or neutrons, e.g., the effects of alpha and neutron radiation are more damaging to the human body than gamma radiation.

The dose equivalent is measured in rems (roentgen equivalent man) or 1/1000th of a rem (millirem or mrem). A rem for each type of radiation is equal to the absorbed dose (in rads) times a quality factor that reflects the fact that some types of radiation cause more damage than others [see “Units of Radiation Dose,” 10 CFR § 20.1004]. The scientific community is shifting to use the nomenclature developed for the international system unit, so the term sievert (Sv) is often used.

1 rem = 0.01 sievert (Sv); 1 sievert (Sv) = 100 rem; 1 millisievert (mSv) = 0.1 rem or 100 mrem.
100 rem is equivalent to 1 Sv or 0.1 rem (or 100 mrem) equals 1 mSv.

Effective Dose is the tissue (organs) weighted sum of equivalent doses summed over all specified tissues and organs where each tissue is assigned its own tissue weighting factor (written as w_T). The tissue weighting factor is intended to represent the relative contribution of that tissue or organ to the total health detriment resulting from uniform irradiation of the whole body.

Government Road Project for purposes of this Petition, means a road construction or repair project that is authorized by federal, state or local governments consistent with applicable Federal Highway or state Departments of Transportation (DOT) standards and specifications, including public works departments that have adopted the state DOT standards and specifications or developed such standards in consultation with state regulatory authorities (such as the Federal Highway Administration (FHWA) regulations and guidance, State Department of Transportation (DOT), American Association of State Highway (AASHTO), American Society for Testing and Materials (ASTM)) or other generally accepted specifications for road building.

Petition Maximum average radium (226) concentration limit: The Petition requests that EPA approve use of PG containing an average radium (226) concentration up to 35 pCi/g in road construction. The 3 in 10,000 risk level (EPA’s safe level) corresponds to an average radium (226) concentration of 148 pCi/g. Thus, this proposed limit is presumptively safe.

The requested limit of 35 pCi/g is consistent with the 2019 stack sampling and with prior sampling conducted by EPA. Specifically, the broad sampling data demonstrates that PG taken from the stacks is not expected to exceed that limit. As background, the risk assessment used 27 pCi/g for its baseline evaluation (this correlates to the international standard of 1Bq) and extrapolated to reach conclusions for 35 Ci/g (see Nominal radium 226 concentration definition below). An average radium (226) concentration of 35 pCi/g for PG used in road construction materials accounts for potential variability (~30 percent) observed in past testing and during implementation of road construction.

Nominal radium (226) concentration: The radium (226) concentration level utilized in the underlying Risk Assessment filed with the petition (the Petition’s Risk Assessment) is a nominal radium (226) concentration of 27 pCi /g. This particular nominal concentration was chosen so that the submission contained a calculated risk using RME, which corresponds to a “nominal” concentration of radium (226). Since the relationship of radium (226) concentration in PG to risk is proportional, the risk from using PG containing any other concentration of radium (226) in road construction can be calculated from the nominal concentration.

Radioactivity is a measure of the amount of gamma rays, alpha or beta particles, x-rays, or neutrons that disintegrate from a gram of the substance being measured (in our situation, in each gram of PG). The amount of radioactivity in a gram of a substance is measured in curies (Ci) or becquerels (Bq). One curie is 3.7×10^{10}

radioactive decays per second, roughly the amount of decays that occur in 1 gram of radium per second. A Becquerel is one disintegration per second. Historically, scientists originally used units of Ci. The International System of Units (ISU) now uses Bq.

A picocurie (pCi) is one-trillionth of a curie.

$1 \text{ Bq} = 2.70 \times 10^{-11} \text{ curies} = 0.027 \text{ pCi}$

Many substances (often naturally occurring substances) are radioactive. Generally, the sources for this explanation include EPA, *Radiation Terms and Units*, available at <https://www.epa.gov/radiation/radiation-terms-and-units>; NRC, available at <https://www.nrc.gov>; MIT News, *Explained: rad, rem, sieverts, becquerels A guide to terminology about radiation exposure*, available at <http://news.mit.edu/2011/explained-radioactivity-0328>; National Aeronautics and Space Administration, *Radiation Math*, available at <https://www.nasa.gov>.

Radium (226) concentration level that corresponds to 3 in 10,000 risk management level that EPA has designated as safe. The risk assessment performed for the Petition demonstrates that PG containing a radium (226) concentration of 148 pCi/g presents a risk of 3 in 10,000 (EPA's safe level).

Reasonable Maximum Exposure: An estimate of a conservative exposure case, well above the average case, that is still within the range of possible exposures.

Risk: The regulatory risk assessment process converts a dose equivalent (in mrem) into an upper bound risk (or probability) of developing fatal cancers. It is based on a regulatory assumption that the dose equivalent may cause harmful effects and as the magnitude of this dose increases or decreases, the risk increases or decreases, in direct proportion, respectively, i.e., linearly (e.g., if the dose is halved, the calculated risk is halved). The risk assessment performed for this Petition concludes that an effective dose of 600 millirem corresponds to a risk of 3 in 10,000 (i.e., if all of the protective assumptions are valid, 3 in 10,000 people may develop a fatal cancer). The actual risk is likely to be lower.

I. OVERVIEW

A. INTRODUCTION

Approximately 46 million tons of phosphogypsum (PG) is produced annually in the U.S. as a byproduct of the phosphate fertilizer production process.¹ For decades, the majority of PG has been placed in large engineered gypstacks, instead of using the material in various applications.

Internationally, PG is used in road construction, concrete and building material production, agriculture, mine restoration, marine applications and for daily landfill cover. Scientific studies completed in both the U.S. and internationally support these beneficial uses of PG. The studies demonstrate use of PG in numerous applications is protective of human health and the environment and, at least as protective of human health as storage of PG in a stack.

This Petition, submitted by The Fertilizer Institute² (TFI), requests approval for PG use in government road construction projects. The request is submitted pursuant to the United States Environmental Protection Agency's (EPA) rule governing the distribution and use of phosphogypsum for purposes other than disposal in a stack. See 40 CFR §61.206.³ Under this provision, a request for a proposed use with supporting information⁴ must be submitted to EPA. The request is followed by EPA review and a determination allowing or rejecting the proposed use. EPA may make a determination granting the request if the proposed use is at least as protective of public health, in the short and long term, as disposal in a stack. If EPA makes a determination approving the proposed use, specific information in connection with the projects conducted must be certified and maintained for five years. For example, each time PG is removed from the stack for the approved use, the stack owner/operator must certify the identity and location of the user, the quantity of PG provided, a description of the end use, and the average radium 226 concentration.

This Petition should be approved by EPA because:

¹ Policy Navigation Group, Economic Analysis of Phosphogypsum Reuse, 12 (December 2019) (Prepared for TFI), based on weighted average PG production per stack.

² TFI is the leading voice of the fertilizer industry, acting as an advocate for fair regulation and legislation, a consistent source for trusted information and data, a networking agent, and an outlet to publicize industry initiatives in safety and environmental stewardship. The fertilizer industry contributes \$155 billion to the nation's economy. TFI, available at <https://www.tfi.org/policy-center/economic-impact>. The fertilizer producers, wholesalers and retailers, along with the businesses that serve them, support nearly half a million U.S. jobs with total annual compensation of \$36 billion. *Id.*

³ EPA, National Emission Standards for Hazardous Air Pollutants; Radionuclides, 54 Fed. Reg. 51,654 (December 15, 1989) (1989 Rule).

⁴ The supporting information includes: petitioner identity, description of the proposed use, street location and mailing address of the facility where use, handling or processing of PG occurs, quantity of PG to be used, average radium (226) concentration in PG that will be used, measures to prevent PG releases to the environment, risk associated with the proposed use, including ultimate disposition, management of unused PG, requestor signature.

- The risk of radiation exposure from use of PG in road construction is low, well within EPA's 3 in 10,000 lifetime cancer risk determined to be safe and well below natural background exposure levels.
- Demand for available, cost-effective road construction materials is high. This is particularly true where other materials widely used in road construction, such as coal ash, are anticipated to become scarce and more expensive due to new regulatory constraints on production and storage.⁵ Radiation from PG is similar or less than other materials currently used in road construction.
- Use of PG in road construction has environmental and societal benefits, reducing the amount of material required to be stored in stacks (and potentially eliminating existing stacks over the longer term).
- There are other economic and societal benefits (discussed in more detail in Appendix 6).

B. BACKGROUND

PG is a byproduct of the phosphate fertilizer production process. At a typical U.S. facility, approximately five tons of PG are generated per ton of phosphoric acid produced. Prior to 1989, PG was used in various applications (including, among other uses, in the construction of roads and in agriculture).

NESHAP Regulations Governing PG. Thirty years ago, EPA restricted the use of PG based on the estimated risk from exposure to naturally occurring radioactive material (NORM) in the material. These restrictions are set forth in the regulations governing the management of PG in EPA's National Emission Standards for Hazardous Air Pollutants (NESHAP), Subpart R of title 40 of the Code of Federal Regulations. Subpart R requires that, with very limited exceptions for agricultural use and indoor research, PG must be placed in engineered above ground impoundments (commonly referred to as "gypstacks").⁶

With respect to the stacking exceptions, Section 61.206(a) allows removal of PG from stacks without prior approval⁷ for: (i) outdoor agricultural use of PG containing an average radium-226 concentration not exceeding 10 picocuries per gram (pCi/g) (§61.204) and (ii) indoor research and development not to exceed 7,000 pounds (§61.205).⁸ These uses are self-implementing; no

⁵ Texas Department of Transportation, Technical Advisory, Fly Ash Supply Update (updated 2019), *available at* http://ftp.dot.state.tx.us/pub/txdot/mtd/ta/fly_ash_condensed.pdf. Danny L. Gray, Decrease in Fly Ash Spurring Innovation Within Construction Materials Industry, Vol. 35, Issue 6, Special Issue: Annual Outlook Issue (Jan. 2019), *available at* <https://onlinelibrary.wiley.com/doi/pdf/10.1002/gas.22099>.

⁶ 40 CFR §§ 61.200 - 201.

⁷ EPA later approved placement of PG as landfill cover in a test cell to determine if PG can be used more broadly as a landfill cover. Letter from Jeffrey R. Holmstead, Assistant Administrator of the Office of Air and Radiation, to Michael Lloyd, Jr., Research Director Chemical Processing, Re: FIPR Petition (December 22, 2004) (Holmstead FIPR Letter).

⁸ 40 CFR §§ 61.204 - 61.205.

additional authorization is required. However, the stack owner and the user must comply with specific reporting and record keeping requirements.⁹

Any other uses must first be approved by the EPA Assistant Administrator for Air and Radiation. Under Section 61.206(c), the request may be approved if the proposed use is determined to be at least as protective of public health, in both the short term and the long term, as disposal of PG in a stack.

Post-NESHAP Developments. Since the NESHAP was promulgated decades ago there have been a number of developments in various realms that support broader use of PG.

- **New Scientific Information.** New data are available on the average level of radioactivity in the PG. There is also a better understanding in the scientific community concerning radiation protection and management related to PG use. Studies have been completed in the U.S. and internationally supporting expanded beneficial use of residual material from manufacture of fertilizer; these studies demonstrate protectiveness of human health and the environment.
- **Risk Assessment and Policy Updates.** Risk assessment approaches have progressed based on experience, analytical advances, and evolving policies since the 1980s.

For example, EPA's prior assessments of the risk from use of PG in road construction (e.g., in the 1989 regulations and the EPA 1992 Background Information Document) did not evaluate the potential radiation risk from every possible road design. Rather, EPA recognized that it is not necessary to calculate every potential exposure. It is appropriate and consistent with EPA policy to examine risk by utilizing a "reasonable maximum exposure" approach (RME). According to EPA, the RME is "a conservative exposure case, (i.e., well above the average case) that is still within the range of possible exposures."¹⁰ EPA guidance states that the assessor may derive a high-end estimate of exposure by using maximum or near maximum values for one or more sensitive exposure

⁹ 40 CFR §§ 61.206 – 209. Approvals under §61.206(b) require compliance with sampling procedures (§61.207), certification requirements (§61.208), and records requirements (§61.209(c)), unless the Assistant Administrator decides to waive or modify the record keeping requirements.

¹⁰ EPA, Risk Assessment Guidance for Superfund: Volume III - Part A, Process for Conducting Probabilistic Risk Assessment, EPA 540-R-02-002, 7-1 (2001), *available at* https://www.epa.gov/sites/production/files/2015-09/documents/rags3adt_complete.pdf. (EPA Risk Assessment Guidance for Superfund).

See also Interstate Technology Regulatory Council (ITRC), Decision Making at Contaminated Sites, Issues and Options in Human Health Risk Assessment, 6.1.1 (2015), *available at* https://www.itrcweb.org/risk-3/Default.htm#6.%20Exposure%20Assessment.htm#6.1_Determining_Appropriate_Exposure_Factors%3FTocPath%3D6.%2520Exposure%2520Assessment%7C6.1.%2520%2520Determining%2520Appropriate%2520Exposure%2520Factors%2520%7C_0 (ITRC, Decision Making at Contaminated Sites) (citing EPA Guidance, which states that "[t]he RME . . . can be defined as 'the maximum exposure that is reasonably expected to occur within a potentially exposed population'").

factors, leaving others at their mean value.¹¹ Therefore, RME is not the worst-case exposure and a worst-case exposure analysis was not required by EPA.

RME provides the exposure used to calculate the maximum individual risk (MIR). As long as the risk from RME does not exceed 3 in 10,000, the exposure is “safe” (see discussion of EPA’s policy on the safe risk level for PG (Section IV, below)). By definition, if the risk from a RME exposure for construction workers, truck drivers, road users, and residents is below 3 in 10,000 and, therefore, safe, all other exposures to workers, truck drivers, road users, and residents present even less risk (and in many cases, the risk is much less than 3 in 10,000).

Additionally, there has been an increased awareness of product lifecycles and sustainability. Accordingly, current EPA policies encourage use and recovery of high-volume, low-risk waste. This includes increased emphasis on understanding product lifecycles and sustainability.

- **Regulatory.** It has become apparent that the current requirement to obtain regulatory approval for each and every application of a new use is unwieldy and slows the process of implementing new uses without providing additional protection of human health (i.e., use of updated scientific and risk assessment assumptions demonstrate that road use is safe). As a result, the past interpretations impede innovation and economic efficiencies. The fact that no PG use requests have been submitted in almost 30 years (except for a landfill cover test cell) illustrates this point.
- **Commercial Economics and International Use Precedents.** The economics of gypstacks have changed. The cost to stack and manage gypstacks has increased substantially beyond original expectations. These costs adversely affect the ability of the U.S. fertilizer industry to compete internationally, where PG may be used.

PG is used in many countries outside the U.S. in agriculture, mine restoration, building materials, marine applications, daily landfill cover, and for road construction. More than a dozen beneficial uses have been analyzed worldwide, resulting in significant, successful PG use applications in at least 21 countries.¹²

- **Public Perception.** Perceptions of gypstacks have changed. EPA’s 1989 final rule did not anticipate the range of public sentiment regarding the long term presence of gypstacks. Public pressure to cease this practice is growing.

¹¹ EPA, Exposure Factors Handbook 2011 Edition (Final Report), EPA/600/R-09/052F (2011), *available at* <https://cfpub.epa.gov/ncea/risk/recorderdisplay.cfm?deid=236252> (Exposure Factors Handbook).

¹² See Presentation by The Fertilizer Institute, Beneficial Use of Phosphogypsum (Sept.6, 2018). *Also see* B. Birky, J. Hilton, & AE J. Johnston, Phosphogypsum: Sustainable Management and Use, International Fertilizer Association, Chp 5, 52-63 (2016), *available at* <https://www.fertilizer.org/ItemDetail?iProductCode=10012Hardcopy&Category=ENV> (IFA Sustainable PG Management Report). This section reviews international and U.S. roads constructed with PG. Other chapters address other uses.

Beneficial Use of PG in Government Road Projects. Based on the developments and framework described above, TFI submits this Petition seeking approval of PG for use in government road projects.¹³ The scope of this request is described below.

- **Description.** A paved road consists of a solid surface or top layer that is typically asphalt, concrete, or some other material or mixture approved for use as pavement. The road base is a supporting layer of material approximately 0.25 m thick beneath the surface/pavement and underlying the road base is the sub-grade (as shown in Figure 1). The proposal is for approval of use of PG as road base or surface pavement.
- **Design.** PG may be used as road base or surface pavement when mixed with other materials such as soil, sand or aggregate or in the surface pavement. This Petition requests approval for use of up to (i) 2.5% PG in surface pavement and (ii) 50% PG in road base. This mixture is based on a design of up to equal amounts of PG and soil in roadbed.¹⁴ Using a ratio of 50% or less PG mix in road base, approximately 4000 tons of PG per lane-mile would be used in road base and less than 100 tons per lane-mile would be used in concrete pavement (Appendix 4a: Response to EPA Comments on January 16, 2020).

These ratios are supported by prior technical evaluations. For example, various ratios of PG to soil were studied (from 100% sand to 100% PG) and all mixes had California Bearing Ratio values higher than sand or PG separately. Studies of the road containing PG in Polk County Florida found similar results (Appendix 4a: Response to EPA Comments on January 16, 2020).

- **Exposure analysis.** The road design features analyzed in the Petition (Appendix 2),¹⁵ the Metals Screening Report (Appendix 3), and Response to EPA Comments on January 16, 2020 (Appendix 4a)) were determined to represent RME for all road designs, regardless of the size of the road. That is, the radioactivity levels emitted from the road in using these design assumptions were RME assumptions and did not exceed 3 in 10,000 (Appendix 4a). Thus, assuming the RME calculation is appropriate, the radioactivity exposure risk associated with all other road designs is less than 3 in 10,000, the EPA determined acceptable risk level.

EPA's 1992 BID risk assessment approved the use of PG for agricultural soil amendments as safe.¹⁶ The EPA 1992 BID risk assessment assumed biennial applications of PG over 100 years on agricultural soil (with the PG containing a radium

¹³ The Petition for PG use in road construction covers only paved roads that meet the definition of "Government Road Project" included in this Petition. Unpaved roads have not been evaluated and are not within the request.

¹⁴ This is an upper bound because industry practice recommends similar ratios or less and EPA's 1992 risk assessment used 33.3 percent PG to 66.6 percent soil (see Appendix 2).

¹⁵ EPA, Potential Uses of Phosphogypsum and Associated Risks, Background Information Document, 402 R92 002, 4 26 4 35 (May 1992), available at <https://www.epa.gov/sites/production/files/2015-07/documents/0000055v.pdf> (EPA 1992 BID).

¹⁶ *Id.* at 4-26.

(226) concentration of 10 pCi/g) and no cover.¹⁷ EPA assumed that approximately 2,700 pounds of PG per acre is “spread over a field and diluted by mixing with the soil.”¹⁸

Unlike PG in agricultural use, PG used in road base is mixed with soil (50% PG and 50% soil), application is one-time and not repeated, and there is no cumulative concentration of radium (226).

In each case, the risk is based on the exposure assumptions utilized. The radiation dose (and, therefore the risk) is a function of the average radium (226) in the road base (or cement), not the volume of PG used in a road application.

Figure 1 provides a conceptual view; municipal roads can vary in width and structure.

- **PG Users.** This Petition requests approval to use PG in **government** road construction projects. Thus, the authorized users of the PG would include federal, state and local Departments of Transportation (DOT) or Public Works (PW), and their contractors. Only these governmental agencies are authorized to commission governmental roadways.
- **Project Locations.** Given transportation costs, government PG road construction projects are expected to be located in states that are in sufficient proximity to the PG stacks (i.e., Florida, Georgia, North Carolina, Idaho, Louisiana) to make PG use economically viable. Appendix 7 provides the location of the PG stacks associated with TFI member operations.
- **Project Specifications.** TFI reviewed how similar materials used in road construction are managed to determine how PG would be handled, transported, stored and used in federal, state or local government road projects. PG would not be the first byproduct to be used in road construction (see below). Nor would it be the first byproduct for which road construction specifications were developed to substitute the use of a byproduct for other road building material. Government (particularly State) DOTs have considerable experience in this regard.

While there are distinctions between PG and coal ash, the regulation of coal ash by the states is analogous because the materials are excluded from federal regulation under the RCRA Bevill amendment (42 U.S.C. § 6921(b)(3)(A), Resource Recovery and Conservation Act § 3001(b)(3)(A)). Currently, according to EPA:

[S]tate environmental agencies are primarily responsible for regulating beneficial use [of coal ash, because the] use of coal combustion residuals is currently excluded from federal regulation under EPA's May 2000 regulatory determination that the Bevill amendment applies to such uses. [and] [t]he April 2015 final ... [coal combustion] disposal rule reaffirm[ed] EPA's Bevill determination.¹⁹

¹⁷ *Id.* at 4-5 - 4-6.

¹⁸ *Id.* at 4-5.

¹⁹ EPA, Coal Ash Reuse, How is the Beneficial Use of Coal Ash Currently Regulated? (last updated July 15, 2019), available at <https://www.epa.gov/coalash/coal-ash-reuse>. Technically, the Bevill amendment applies to the type of

Analogously, the use of PG is regulated by the Clean Air Act NESHAP regulatory program based on the radioactivity in PG, but otherwise is excluded from federal regulation under the RCRA Bevill amendment.

Government road projects are constructed in accordance with overarching Federal Highway Administration (FHWA) regulations and guidance, under the direct supervision of state Department of Transportation (DOT) requirements. “Because roadway location and design decisions affect the development of adjacent areas, it is important that environmental variables be given full consideration.”²⁰ These specifications dictate how various materials may be used, based on strength and stiffness considerations, permeability, and stability, among other factors.²¹ The FHWA released guidelines for use of coal fly ash and other materials (e.g., kiln dusts) in asphalt concrete, Portland cement concrete, stabilized base, flowable fill, and embankment or fill.²²

Specifications are designed using various materials testing methods developed by these professional organizations, such as AASHTO and ASTM. Thus, since the RME were selected based on the road construction project meeting these design criteria, the risk assessment represents RME.

State Regulatory Programs. In addition to EPA’s NESHAP determination, use of PG in road construction will be subject to state regulation and oversight. State regulatory programs developed for managing use of industrial by-products will apply as will state specifications for road construction.

For example, the Florida Department of Transportation’s Standard Specifications For Road and Bridge Construction state that roads must: (a) “[p]rovide erosion control measures where work is accomplished in conjunction with the project, to prevent erosion, pollution of water, detrimental effects to public or private property adjacent to the project right-of-way and damage to work on the project;” (b) “not drive in, operate, or place construction equipment or materials in surface waters, wetlands, groundwater, or property beyond the project limits without permitted

waste, not just to the use. The quote describes EPA’s application of the Bevill amendment in this particular use. From a broader perspective, it highlights the fact that state regulators have jurisdiction over many types of waste.

²⁰ Association of State Highway and Transportation Officials (AASHTO), A Policy on Geometric Design of Highways and Streets, 7th Ed., 2-95 (2018), *available at* <https://store.transportation.org/item/collectiondetail/180?AspxAutoDetectCookieSupport=1> (The Green Book) (an online guidance that is over 1,000 pages). AASHTO is a nonprofit, nonpartisan association representing highway and transportation departments and a leader in setting technical standards for design, construction of highways and bridges, materials, and many other technical areas. Consideration of impacts on the environment are explicitly required to be considered. *Id.* at 1-2.

²¹ See Federal Highway Administration, Tech Brief, Bases and Subbases for Concrete Pavements (revised), FHWA-HIF-16-005 (August 2017), *available at* <https://www.fhwa.dot.gov/pavement/concrete/pubs/hif16005.pdf>.

²² Federal Highway Administration, User Guidelines for Waste and Byproduct Materials in Pavement Construction, Coal Fly Ash, FHWA-RD-97-148, *available at* <https://www.fhwa.dot.gov/publications/research/infrastructure/pavements/97148/016.cfm>.

authority for permanent or temporary impacts;” and (c) “not allow water that does not meet state water quality standards or does not meet the permitted criteria to exit the project limits.”²³

There are specifications for and policies encouraging the use of fly ash, slag, and/or other recycled material in roadways in Florida, North Carolina, Louisiana, and Idaho, among other states.²⁴ In Florida, industrial by-products are defined as:

Materials that have a demonstrated recycling potential, can be feasibly recycled, and have been diverted or removed from the solid waste stream for sale, use, or reuse. The term does not include any materials that are defined as recovered materials, a mixed waste stream that is processed to removed recyclable materials; or materials the recycling or use of which is specifically addressed in [FDEP] rules, such as construction and demolition debris, ash residue, waste tires, used oil, and compost. Fla. Admin. Code 62-701.200(51).

Industrial by-products are regulated as solid waste unless otherwise exempted under Fla. Admin Code 62-701.200(51).

Florida is required to:

Encourage recycling and resource recovery as a source of energy and materials. Fla. Stat. §403.704(6);

²³ Florida Department of Transportation, Standard Specifications For Road and Bridge Construction, 131 (July 2020), available at https://fdotwww.blob.core.windows.net/sitefinity/docs/default-source/programmanagement/implemented/specbooks/jul2020/7-20ebook.pdf?sfvrsn=c1f3424e_4 (Florida Spec Book).

²⁴ See for example: Florida, Department of Transportation, State Materials Office, Frequently Asked Questions, available at <https://www.fdot.gov/materials/administration/resources/library/issues-trends/recycling-faqs.shtm>.

North Carolina Department Of Transportation Raleigh, Standard Specifications For Roads and Structures, 10-1 (slag), 1-43 (recycled) (2018), available at <https://connect.ncdot.gov/resources/Specifications/StandSpecLibrary/2018%20Standard%20Specifications%20for%20Roads%20and%20Structures.pdf> (North Carolina Spec Book).

Louisiana Department of Transportation & Development, Louisiana Standard Specifications For Roads And Bridges, 152, 200, 392, 965 (2016), available at [http://wwwsp.dotd.la.gov/Inside_LaDOTD/Divisions/Engineering/Standard_Specifications/Standard%20Specifications/2016%20Standard%20Specifications%20for%20Roads%20and%20Bridges%20Manual/00%20-%202016%20-%20Standard%20Specification%20\(complete%20manual\).pdf](http://wwwsp.dotd.la.gov/Inside_LaDOTD/Divisions/Engineering/Standard_Specifications/Standard%20Specifications/2016%20Standard%20Specifications%20for%20Roads%20and%20Bridges%20Manual/00%20-%202016%20-%20Standard%20Specification%20(complete%20manual).pdf).

Idaho Transportation Department, 2018 Standard Specifications for Highway Construction (2018), available at <https://apps.itd.idaho.gov/apps/manuals/SpecBook/SpecBook18.pdf>.

This wide spread development by the states of specifications for the use of various recycled material is strongly encouraged by the federal government. Federal Highway Administration, Recycled Roadways, FHWA-HRT-05-003 (Jan/Feb 2005), available at <https://www.fhwa.dot.gov/publications/publicroads/05jan/02.cfm>.

Similarly, see AASHTO, Center for Environmental Excellence, The Growing Need for and Importance of Waste Minimization and Recycling, subchp. 3.12.1, (last updated 2005), available at https://environment.transportation.org/environmental_issues/construct_maint_prac/compendium/manual/3_12.aspx.

Provide technical assistance to counties, municipalities, and other persons, and cooperate with appropriate federal agencies or private organizations in carrying out this Act. Fla. Stat. §403.704(2); and

Assist in and encourage, as much as possible, the development within the state of industries and commercial enterprises which are based on resource recovery, recycling, and reuse of solid waste. Fla. Stat. §403.704(7).²⁵

Further, the Florida DOT is required to encourage the use of products and materials with recycled content in its road construction programs and to continually update its bid procedures and specifications to encourage the use of such products and materials, *see* Fla. Stat. §336.044(4). Therefore, once EPA authorizes use of PG in road construction, the Florida DOT will have a clear path under Florida law to consider whether its existing road specifications are adequate or if any modifications are warranted.

Similarly, North Carolina has design specification guidance.²⁶ Notably, North Carolina includes a policy “to aid in reduction of materials that become a part of our solid waste stream.”²⁷

In Idaho, using fly ash as an example, materials may be used only if provided by manufacturers approved by the state’s Quality Assurance Program (QAP). Manufacturers not approved under the certification program require pre-approval before use.²⁸ The QAP mandates sampling be conducted by accredited labs, among other requirements. Idaho has recently passed a law that requires the development of a regulatory program for PG use.²⁹

Louisiana’s Solid Waste Management and Resource Recovery Law directs maximum practicable use of resource recovery procedures.³⁰ The Louisiana Solid Waste Regulations include Section 1105: Beneficial Use of Other Solid Wastes which allows owners of waste streams to request that the waste be designated for an approved beneficial use. The application process specifies much of the same information required under the NESHAP regulation 40 CFR 61.206(b), and indicates that, at least in Louisiana, prior to any use of PG in road construction, the state may be required to make a determination similar to EPA, including approval of a handling and storage plan.³¹

²⁵ Fla. Stat. § 403.704.

²⁶ North Carolina Spec Book, *supra* note 24.

²⁷ *Id.* at 1-43, Section 104-13.

²⁸ Idaho Transportation Department, Quality Assurance Manual, §230.02.02 (2019), *available at* <https://apps.itd.idaho.gov/Apps/manuals/ManualsOnline.html>.

²⁹ H.B. 367, 65th Leg., 2d Reg. Sess. (Idaho 2020) (signed by Gov. on Mar. 9, 2020, Sess. Law Chp. 51, eff. Jul. 1, 2020).

³⁰ Louisiana Solid Waste Management and Resource Recovery Law, La. Rev. Stat. § 30:2154(1).

³¹ La. Admin. Code 33:VII:1:1105.

The existence of these stringent state regulatory programs coupled with the need for a specific DOT specification for PG use in roadbuilding provide additional assurances that EPA's approval of PG use in road construction will ensure responsible handling and management of PG in road construction. Therefore, once EPA authorizes use of PG in road construction, the states will be able to make informed choices as to the most appropriate and cost-effective road construction material, while still ensuring the protection of the environment.

Public Health and Environmental Evaluation. The Petition is accompanied by a Radiological Risk Assessment (Appendix 2) and a Human Health Risk Screening for Metals and Metalloids (Appendix 3). The scope and approach to these analyses were developed based on the EPA PG Workbook, prior petitions, and a series of working meetings with EPA staff that provided the benefit of EPA input and direction on key elements of the analysis.

To assist in this evaluation, TFI members measured the radioactivity level in the PG from stacks.³² Results reflect that average radiation levels from the composite samples taken from stacks do not exceed: (a) the nominal radium (226) concentration used in the risk analysis (i.e., 27 pCi/g) and (b) more importantly, the 148 pCi/g radium (226) concentration corresponds to the 3 in 10,000 risk management level that EPA has designated as safe (see Sections II(B), III(G), V, V(D)(3,4), below).

Key points of the Radiological Risk Assessment are provided in Attachment B. In summary, this assessment demonstrates that PG can be used safely for road construction for the following reasons:

Use of Reasonable Maximum Exposures (RME) Ensures Risk is Less than 3 in 10,000

All RMEs resulting from use of PG in road construction correspond to a risk of less than the 3 in 10,000 lifetime cancer risk (the risk level that EPA has determined to be safe for alternative PG uses and well below natural background exposure (see Summary Table 1, below, and the Petition's Risk Assessment summarizing the risks from each of the five exposure scenarios calculated for this Petition)). EPA staff clarified interest in more risk distribution information on how the risk varied with the "variation of the geometry of exposure" and with different exposure time frames (Appendix 4a: Response to EPA comments on January 16, 2020). The risk distribution is similar in each scenario with the the highest risk associated with the RME exposure scenario. Most actual exposures are less than those received by the RME and hence the associated risk would also be lower (Appendix 4a: Response to the EPA Question on January 16, 2020). For example, the risk is lower for workers who are not exposed for the same duration or as directly as the RME scenarios. The analysis also shows that the risks for the residential RME scenario are much lower than for the construction worker, truck driver, and road user. In each case, most of the exposed population have a dose that is lower than the RME dose (see Appendix 4a: Response to EPA Comments on January 16, 2020).

³² A summary of this data was provided to EPA to support this Petition in a separate report, along with the location and address of each facility (Appendix 5).

Table 1: Dose, Risk, and Background Summary for All RME Scenarios

Receptor	CSM	Exposure Duration (years)	Exposure Dose (mrem)	Estimated Cancer Risk	Background Dose from Exposure Duration (mrem)	Exposure Dose Percentage of Background Dose (%)
Reasonable Maximum Exposure Scenarios						
Road Construction Worker	PG in Road Base	5	110	0.5 in 10,000	1550	7%
Road User (Motorist/Bicyclist)	PG in Road Base & Surface	26	28	0.1 in 10,000	8060	0.3%
Truck Driver	PG-containing material for Road Base	5	93	0.5 in 10,000	1550	6%
Nearby Resident	PG in Road Base & Surface	26	16	0.08 in 10,000	8060	0.2%
Utility Worker	PG in Road Base	1	0.8	0.004 in 10,000	310	0.3%
EPA Cancer Risk Management Goal			600	3 in 10,000	600	

Estimated cancer risk below this goal.

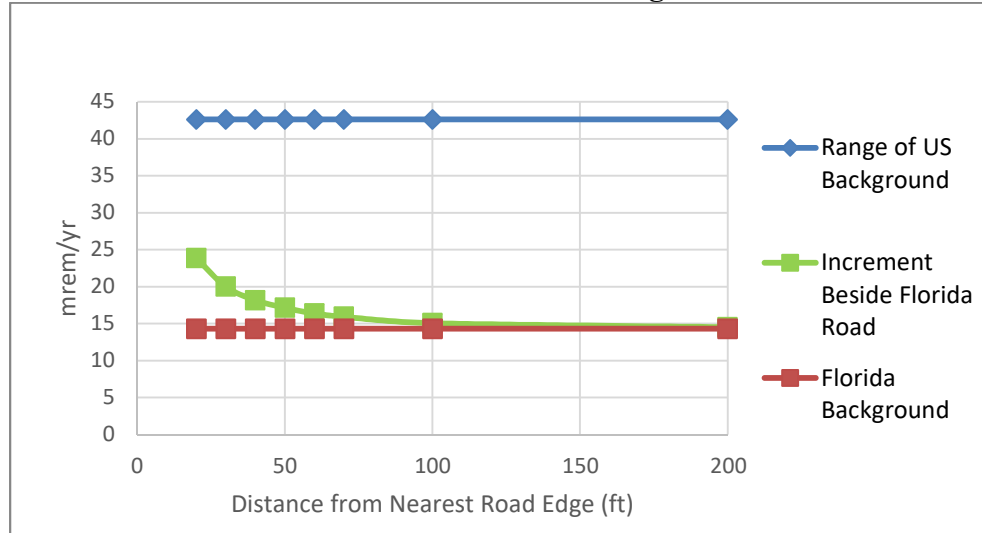
- The highest risk in the Petition's Risk Assessment was for the RME construction worker scenario --- 0.5 in 10,000 and the RME worker dose is 7% of the background dose for a worker at a road construction site not using PG (see Table 1, above, summarizing the risks from all exposure scenarios).
- The Response to the EPA Comments on January 16, 2020 expanded on the Risk Assessment by evaluating the uncertainty in each of these exposure scenarios and finding no significant increase even using the assumptions postulated in the EPA comments. In any case, the postulated assumptions were in excess of the RME and did not warrant a change in the risks in the Petition's Risk Assessment.

Risk Distribution Issues

Most of the exposed populations have a dose that is lower than the dose of the RME individual. For example, most road construction workers are exposed to a dose of less than 110 mrem, thus the risk is lower than 0.5 in 10,000 (still assuming that the radium (226) concentration is 27 pCi/g).

Residents directly adjacent to the road (the RME individual) are calculated to have a risk of 0.08 in 10,000, which is much lower than the RME construction worker. Additionally, the dose (16 mrem) is only 0.2% of the background radiation dose of the resident adjacent to a road not using PG. Thus, the incremental risk above background from a road containing PG is very low. Dose (and, therefore, risk) decreases substantially as distance from the edge of the PG road increases (see Figure 2 below). As a result, residents whose houses are not adjacent to the PG road have essentially no incremental dose and risk.

Figure 2: Incremental External Gamma Dose with Distance Compared to Terrestrial Background



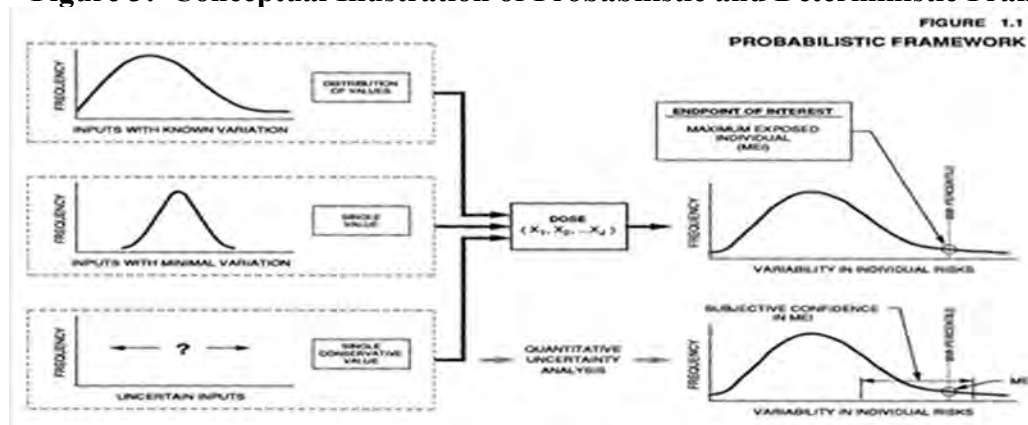
(From Response to EPA Questions on January 16, 2020)

N.B.: All natural background (as used in Table 1 is higher than the Terrestrial background utilized in this Figure).

Uncertainties in RME Selection, Design and Average Radium (226) Concentrations

The Petitioner's Risk Assessment and the Arcadis Response to EPA Comments on January 16, 2020 (Appendix 4a) compile and discuss in more detail the potential uncertainties in the risk assessment and the justification for the RMEs. For example, the design criteria used in the risk assessment were set at RME. The process of selecting the RMEs for this Petition was performed after evaluation of the road construction process and extensive pre-petition dialogue with EPA staff.

For example, TFI's consultant intentionally chose (and EPA staff tentatively accepted) a deterministic approach. A full probabilistic approach is resource intensive, but in this situation use of a reasonable maximum exposure (RME) and an explanation of the risk distribution achieves the same goal as a probabilistic approach (see Appendix 4a: Response to EPA Comments on January 16, 2020). The RME is one point on a probabilistic distribution (see conceptual figure provided below, Figure 3, which uses 90th percentile to illustrate the concept). EPA guidance does not dictate a particular percentile as an RME, e.g., the RME for the duration of living at home is 90th percentile, but some EPA risk assessments utilize lower percentiles depending upon the facts.

Figure 3: Conceptual Illustration of Probabilistic and Deterministic Frameworks

(This conceptual figure uses a 95th percentile to illustrate a high end exposure. But as noted in EPA guidance the assessor may derive a high-end estimate of exposure by using maximum or near maximum values for one or more sensitive exposure factors, leaving others at their mean value.)³³

The Response to EPA Comments on January 16, 2020³⁴ describes in more detail the substantive rationale for the RME selections and the impact of variations in design factors.

For example, the Petitioner's Risk Assessment used a distance of 50 ft between roads and homes.³⁵ According to the Federal Highway Administration, the "new Interstate road needs a right-of-way width of 150 to 300 feet or more; a generation ago, roadbuilders could get by with 50 or 75 feet."³⁶ The larger the right of way, the lower the radiation level to residents.

Also, the Petition's Risk Assessment calculated the risk based on a road bed containing 50% PG and 50% soil. A 50:50 mixture of PG and local construction materials:

"[I]s likely to be an overestimate of the actual mix. The EPA for example in their 1992 BID used a 1:2 mix of PG:sand. This is also the ratio in the Polk and Columbia county roads constructed by FIPR with input on the design and testing of the roads from the University of Miami and the Bureau of Materials & Research, the Florida Department of Transportation. This ratio is less than the ratio of two parts PG to one part soil utilized in EPA's 1992 BID risk assessment."³⁷

³³ Exposure Factors Handbook, *supra* note 11.

³⁴ Appendix 2 to this Petition is the same as the Petition's Risk Assessment (Petitioner's Risk Assessment). Appendix 4a addresses questions EPA raised concerning the original risk assessment (Response to EPA Comments on January 16, 2020).

³⁵ Petitioner's Risk Assessment at 3-2.

³⁶ Federal Highway Administration, Highway History, The Size of the Job, *available at* <https://www.fhwa.dot.gov/infrastructure/50size.cfm>.

³⁷ Petitioner's Risk Assessment, *supra* note 34, at 2-5 n. 9 and Response to EPA Comments on January 16, 2020, *supra* note 34, see answer to EPA question 5.

Thus, EPA and other precedent accepts a 50-50 ratio as a RME. If the specific design for a particular road contains less than 50% PG then the risk is lower than the risk from RME.

Similarly, the concentration of radionuclides in concrete paving was assumed to be 2.25% PG, based on PG 15% by weight in cement and cement 15% by weight in concrete which is the same assumption utilized in the EPA 1992 BID risk assessment.³⁸ As a practical matter, the literature on the use of normal “gypsum” supports an upper limit of 15%.³⁹ If less than 15% PG is used, the average PG in the cement is less than 2.25% PG in surface pavement and the risk is lower than calculated in the Risk Assessment. Consistent with EPA policy, 50% PG for road base and 2.25% for surface pavement are appropriate RMEs. Also evaluated are the inevitable relatively slight variations in the risk potentially due to slight variations in the implementation of a 1 to 1 ratio of PG to soil in the road bed design standard (e.g., if the ratio 1.2 to 0.8 instead of 1 to 1) and the 2.25% PG in road surface design standard (e.g., if percentage of PG in the road surface is 2.7% instead of 2.25%). These variations in the input into the Risk Assessment do not significantly increase the risk. As noted above, various ratios of PG to soil were studied (from 100% sand to 100% PG) and all mixes had California Bearing Ratio values higher than sand or PG separately. See generally Appendix 4a.

As demonstrated in Appendix 4a, most of the other design features do not increase the level of radioactive emissions from the road. For example, the dose to a local resident adjacent to the road does not increase if the road has eight lanes or two lanes.

The data on the concentration of Radium-226 in the stacks (see summary above and more detailed discussions below in this Petition and in Appendix 5) are all well below the nominal concentration used in the risk assessment, therefore, the actual risk from PG use is likely to be well below the risk calculated in the Petition’s Risk Assessment.

³⁸ Petition’s Risk Assessment, *supra* note 34, at 2-5.

³⁹ Since PG cannot be used in road construction in the U.S., the literature on PG is limited. However, the literature on the percentage of gypsum used in cement suggests that 15% is a reasonable number. For example, the “optimum addition of gypsum for Atbara clinker would be in the range of 3% to 5%.” Amin Abdelrahman & Mohamad H. Aboud, Determination of Optimum Quantity of Raw Gypsum Addition for Atbara Cement Clinker, Khartoum University, 5, available at <http://www.jeaconf.org/UploadedFiles/Document/82d8a051-43ad-44fa-ab1d-1ac182000608.pdf>.

Similarly, the gypsum content of 5% in the composition of cement is referenced. Available at <https://www.engr.psu.edu/ce/courses/ce584/concrete/library/construction/curing/composition%20of%20cement.htm>.

Further, another article cites the use of 3% to 5% gypsum in cement. Karen L. Scrivener, Vanderley M. John, & Ellis M. Gartner, Eco-efficient cements: Potential economically viable solutions for a low-CO2 cement-based materials industry, Cement and Concrete Research. Vol. 114, 2-26 (Dec. 2018), available at <https://www.sciencedirect.com/science/article/pii/S0008884618301480?via%3Dihub>.

There is a significant reduction in the split tensile strength at 15% phosphogypsum content. Thus the optimum amount of phosphogypsum in concrete is found to be 10%. Kuriakose Reju & P.K. Shaji, Effect Of Calcined Phosphogypsum In Portland Pozzolana Cement Concrete, International Research Journal of Engineering and Technology (IRJET) Vol. 05, Issue: 04, 2008 (Apr. 2018), available at <https://pdfs.semanticscholar.org/d7cc/03c3de65ca412971fff244b37098d479d4ab.pdf>.

All of the risk values in Table 1, above, are based on the RME assumptions and the assumption that the average radium (226) concentration in this PG is 27 pCi/g. The use of a radium (226) concentration of 27 pCi/g was chosen so that the submission contained a calculated risk which corresponds to a “nominal” concentration of radium (226).⁴⁰ Since the relationship of radium (226) concentration in PG to risk is proportional, the risk from using PG containing any other concentration of radium (226) in road construction can be calculated from the nominal concentration. Thus, a concentration of radium (226) in PG of 35 pCi/g (the radium (226) concentration proposed in the Second Revised Petition as the radium (226) concentration limit on PG used in road construction) can easily be calculated to be 0.65 in 10,000 (well below the risk management level used in the PG use guidance of 3 in 10,000). Conversely, the risk of 3 in 10,000 (EPA’s safe risk level) corresponds to a radium (226) concentration in the order of 148 pCi/g (see this section and Sections III(G), V, V(D)(3,4), below). The discussion of the rationale for selecting a radium (226) concentration limit of 35 pCi/g is explained below

The use of 27 pCi/g is a reasonable value for the “nominal” radium (226) concentration given historic sampling of U.S. PG stacks and the average radium (226) concentrations utilized in the 1992 EPA BID risk assessment. However, TFI members sampled nine stacks located in four states in 2019.⁴¹ The average radium (226) concentration of all 90 samples was 18.6 pCi/g with individual samples ranging from 6.3 pCi/g to 27.9 pCi/g.⁴² The average concentration of radium (226) per PG stack ranged from 7.44 to 24.7 pCi/g (which is relevant because the PG for road construction use is likely to be from an individual stack). Within each stack sampled, the ratio of the highest to lowest measured concentration ranged from 1.2 to 3.7 pCi/g. These recent data found average stack radium (226) concentrations are well below the nominal concentration of 27 pCi/g used in the Petition’s Risk Assessment, the 35 pCi/g concentration limit proposed in the Petition as the limit in the PG used in road construction, and significantly below the 148 pCi/g corresponding to the 3 in 10,000 safe risk level.

If the average concentration of radium (226) per PG stack measured by TFI members (i.e., 4.77 to 24.7 pCi/g) is utilized in the risk assessment, the RME construction worker’s risk from the PG used in road construction work ranges from about 0.09 in 10,000 to 0.5 in 10,000. Similarly, the risk to nearby residents directly adjacent to the road (the RME individual) is approximately 0.01 in 10,000 (1.4 in one million) to 0.7 in 10,000.

Given the range of individual concentrations in the historic and recent sampling of PG stacks and the variation within the stacks between the highest and lowest radium (226) concentration, it is exceedingly unlikely that the average concentration of radium (226) in any stack would be close to 148 pCi/g. Thus, variations in radium (226) will not significantly increase the risk and, in any case, the PG limit is 35 pCi/g, well below the 3 in 10,000 safe risk level. Thus, EPA could approve use of PG from stacks without any sampling.

⁴⁰ An average of 35 pCi/g also represents the highest average level identified in prior testing by EPA. To account for some potential variability (~30 percent) that has been observed in past testing, the relief sought in this petition seeks approval to use PG containing radioactivity levels of up to an average of 35 pCi/g in road construction materials.

⁴¹ TFI, Supplement to the October 11, 2019 TFI Phosphogypsum Reuse Petition: 2019 Radium-226 Results for U.S. Phosphogypsum Stacks, 1 (December 5, 2019) (TFI 2019 Sampling). Further discussion of this new data is provided below.

⁴² *Id.* at 1.

The proposal in the 2019 Petition and this Second Revised Petition proposes annual sampling to provide continuing documentation that each shipment does not contain PG with an average radium (226) concentration above 35 pCi/g. The reasons for this suggested limit are as follows. First, a radium (226) concentration of 35 pCi/g is well below the radium (226) concentration of 148 pCi/g that corresponds to the 3 in 10,000 risk level (EPA's "safe" level). Thus, a maximum average concentration of radium (226) of 35 pCi/g is "safe." Second, TFI recognizes that EPA historically has utilized this regulatory approach so the likelihood of approval of the Revised Petition will be enhanced if the approval uses a maximum radium (226) concentration. Third, the requested limit of an average radium (226) of 35 pCi/g represents the highest average level identified in prior testing by EPA. Thus, this approach will make implementation more efficient. Fourth, an average radium (226) concentration of 35 pCi/g for PG used in road construction materials will account for some potential variability (~30 percent) that has been observed in past testing and during implementation of road construction. Finally, as more data is gathered over time during the implementation of this new use, TFI reserves the right to request EPA modify its approval to include a more efficient implementation approach.

The Response to the EPA Comments on January 16, 2020 performed a series of additional evaluations of the impact from the uncertainty in each of the exposure scenarios and found no significant increase in total risk, even when using the assumptions postulated in the EPA comments. In any case, the postulated assumptions are all less conservative than the RME scenario and did not warrant a change in the risks in the Petition's Risk Assessment.

Thus, consistent with the regulations governing EPA's approval of PG uses, the use of PG in road construction is safe and at least as protective as placement of phosphogypsum in a stack.

Table 2, below provides a summary of comments on risk distributions by exposure pathway. The table explains the limited applicability of the RME scenario and the potential for lower exposures and doses to occur for a broader population (taken from the Response to EPA Comments on January 16, 2020).

TABLE 2: SUMMARY OF RISK DISTRIBUTION FROM USE OF PG IN ROAD CONSTRUCTION		
Exposure Scenarios	RME (small number of people)	Potential Lower Exposures and Risk Distribution
Road Construction Worker	<p>Risk: 0.5 in 10,000</p> <p>Few if any workers would fit the RME assumption of 100% of workdays on the uncovered road base.</p> <p>The RME worker is exposed to less than 7% of background levels (for all members of the public).</p>	<p>Much less than 0.5 in 10,000</p> <p>Most workers are expected to spend less than 100% of the workday on the uncovered road base.</p> <p>Dose and risk reduce linearly with reduced exposure time. Time on a covered road base was shown in the Risk Assessment to be a factor of 5 lower.</p> <p>The dose would range down to essentially zero for management and supervision who would spend very limited time on the road and out of vehicles.</p> <p>The number of workers in a road crew is estimated to be as small as 6 – 8 workers, which limits the risk distribution to a small group.</p>
Road User	Risk: 0.1 in 10,000	Well below 0.1 in 10,000

TABLE 2: SUMMARY OF RISK DISTRIBUTION FROM USE OF PG IN ROAD CONSTRUCTION

	<p>This RME is assumed to be a heavy user of the road spending 2 hours daily on the road. This scenario is unlikely to occur until far into the future if PG roads become widely available. Until then it is unlikely a commuter would be able to spend this amount of time on a PG road.</p> <p>In the extreme case, the RME road user is exposed to less than 0.3% of background.</p>	<p>Most road users will be on the road for much less than two hours per day.</p> <p>Dose and risk reduce linearly with reduced exposure time.</p> <p>Initially when PG use in roads is newly implemented the availability of PG roads will be low reducing the opportunity to have substantive usage time.</p> <p>As the total amount of PG roads increase the risk distribution would increase with additional road users and cumulative usage time.</p> <p>The overall risk to an individual however, is not expected to exceed the RME estimates. Most road users would still have limited time on PG roads and this results in a proportionally limited dose and risk.</p> <p>The overall number of road users is difficult to specify as it depends on several factors including the road type and location relative to populated areas. However, the dose to road users would remain a small fraction of that from unavoidable background radiation.</p>
Truck Driver	<p>Risk: 0.5 in 10,000</p> <p>The Truck Driver RME is limited to workers who participate in PG road construction projects.</p> <p>The assumptions for this scenario are set to estimate the upper end of likely dose and risk for this work.</p> <p>The RME Truck Driver is exposed to less than 6% of background levels.</p>	<p>A truck driver that has less than an RME exposure has lower risk than 0.5 in 10,000.</p> <p>There are a limited number of truck drivers involved in a road construction project. In addition, truck drivers will support numerous construction projects during the course of a year and many not involving use of PG. This limits the risk distribution for this exposure pathway to a relatively small number of people.</p> <p>In many cases, Truck Drivers will not work on PG road construction as much as assumed for the RME, resulting in a lower dose and risk.</p>
Nearby Resident	<p>Risk: 0.08 in 10,000</p> <p>The Nearby Resident RME is based on extreme assumptions that are unlikely to apply to all residents of a PG road. The assumptions include close exposure to the road and long durations of residency throughout the exposure period.</p> <p>Based on these assumptions the Nearby Resident RME is exposed to 0.2% of background levels.</p>	<p>Most residents near a PG road would be exposed to much lower doses and risk, well below 0.08 in 10,000.</p> <p>Radiation levels from a PG road decrease rapidly with distance from the road and become indistinguishable from background at 50' to 100'.</p> <p>As a result, most residents immediately beside a PG road would be exposed to much less than the RME risk level, and residents beyond the immediately adjacent properties would experience essentially zero incremental risk.</p> <p>The overall risk distribution would depend on the overall length of the PG road and population density along the road but is limited to only those locations immediately beside the PG road.</p>
Utility Worker	<p>Risk: 0.004 in 10,000</p> <p>The Utility Worker RME scenario represents an extreme case where a worker needs to disrupt the road for</p>	<p>Most Utility Workers would be exposed to risk much less than 0.004 in 10,000.</p> <p>Most utility repair requirements would involve exposure scenarios below those assumed for the RME conditions,</p>

TABLE 2: SUMMARY OF RISK DISTRIBUTION FROM USE OF PG IN ROAD CONSTRUCTION		
	<p>road or utility maintenance.</p> <p>The assumptions use worst case conditions to estimate the risks and are limited to workers in a trench in a PG road and meeting the other exposure assumptions.</p> <p>The RME Utility Worker is exposed to approximately 0.3% of background levels.</p>	<p>due to smaller trenches and exposure areas, or shorter durations.</p> <p>The number of individuals entering a trench in a PG road is also limited based on the uniqueness of the work and the limited space.</p> <p>As a result, the risk distribution for the Utility Worker is limited to a small number of individuals.</p>
Reclaimer Extreme Scenario	<p>Reclaimer is an extreme scenario well beyond an RME assumption and therefore, is not appropriate to determine whether the use of PG is safe.</p> <p>This example for ultimate disposal was selected due to the use by EPA in 1992.</p> <p>Risk: 0.4 in 10,000</p> <p>The Reclaimer would be exposed to approximately 1% of background levels.</p> <p>(total exposure of 78 mrem compared to a Background of 8,060 mrem over 26 years)</p>	<p>The Reclaimer scenario represents an extreme situation that is unlikely to even occur as described (Appendix 4b: Responses to Second Set of USEPA Questions - Reclaimer). As a result, the risk distribution is effectively zero.</p> <p>More realistic situations for the ultimate disposal of the road include continued use of the road as a road, or reuse of the PG road base for a new road, if the road was to be relocated or realigned.</p> <p>In the extreme case where a road is abandoned and then the land is reused for other purposes, the land preparation activities will realistically result in blending and mixing of the road base to levels that are indistinguishable from background levels.</p> <p>Overall, the risk distribution would be effectively zero.</p>

In summary, the risk distribution from road construction is negligible, beyond the individuals who are on or immediately beside the road, as assessed in the Risk Assessment document. Thus, consistent with the regulations governing EPA's approval of beneficial uses, the use of PG in road construction is safe and at least as protective as placement of phosphogypsum in a stack.⁴³

II. PETITION REQUEST AND LEGAL REVIEW PROCESS

A. Specific Relief Sought

This Petition requests the following:

⁴³ EPA's "assessment of the maximum individual lifetime risk of fatal cancer from radon emissions from stacks" was "less than three in ten thousand (3×10^{-4}) to the maximally exposed individual." EPA, Applying to EPA for Approval of Other Uses of Phosphogypsum: Preparing and Submitting a Complete Petition Under 40 CFR 61.206: A Workbook, 5 (2005), available at https://www.epa.gov/sites/production/files/2015-05/documents/wrkbk_sub-r_appl_1105.pdf (EPA PG Workbook).

Therefore, "the risk assessment must demonstrate that the proposed other use will not cause a threat to the public or environment greater than if the phosphogypsum were left in the stack. This means that the risk assessment must show that the chance of developing a fatal cancer in people who are exposed to phosphogypsum as a result of the use for which you are applying must not be more than three in ten thousand (3×10^{-4})."*Id.* at 13.

A determination by EPA, pursuant to 40 CFR § 61.206, that PG containing up to an average of 35 pCi/g may be used in road base, paving, and various combinations of road base and paving in Government Roadway Projects that meet the commitments of this petition and are:

1. Authorized by federal, state and local Departments of Transportation (DOT) or Public Works (PW), and
2. Conducted as part of a government road project using appropriate, generally accepted road construction standards and specifications such as ASTM, FHWA, federal or state DOT standards and specifications, or standards developed or approved in consultation with the appropriate regulatory DOT or PW authorities.⁴⁴

B. Legal Review Process

1. Components of Petition

40 CFR § 61.206(b) provides the Petition must be in writing and should address the following topics:

- The name and address of the person(s) making the request.
- A description of the proposed use, including any handling and processing that the phosphogypsum will undergo.
- The location of each facility, including suite and/or building number, street, city, county, state, and zip code, where any use, handling, or processing of the phosphogypsum will take place.
- The mailing address of each facility where any use, handling, or processing of the phosphogypsum will take place, if different from paragraph (b) (3) of this section.
- The quantity of phosphogypsum to be used by each facility.
- The average concentration of radium-226 in the phosphogypsum to be used.
- A description of any measures which will be taken to prevent the uncontrolled release of phosphogypsum into the environment.
- An estimate of the maximum individual risk, risk distribution, and incidence associated with the proposed use, including the ultimate disposition of the phosphogypsum or any product in which the phosphogypsum is incorporated.

⁴⁴ There are 50 states and each has its highway design guidance documents. Federal and state transportation departments generally cite the Green Book, *supra* note 20. Attachment B contains representative examples of road way specifications (including alternative materials that may be used in road construction from Florida, Louisiana, Idaho, and North Carolina and the Green Book).

- A description of the intended disposition of any unused phosphogypsum.
- The Petition must be “signed and dated by a corporate officer or public official in charge of the facility.”

2. EPA’s Determination and Risk Management Decision

The decision to approve a new use for PG must be made by EPA’s Assistant Administrator for the Office of Air and Radiation (OAR). As a matter of policy, the decision involves weighing results of a risk assessment, technical analyses, and other factors.⁴⁵

Section IV summarizes the Risk Analysis and metals screening evaluation that have been completed and demonstrate the safety of PG use in road construction. Key exposure and risk calculations and application of EPA’s risk management criteria are described.

Section V provides TFI’s justification for approval of this Petition and explains these factors as TFI submits they should apply to EPA’s risk management decision. In conclusion, the road construction scenarios were evaluated for numerous risks (e.g., a broad scope of RME radiological exposures and non-radiological constituents present in PG). The analyses clearly demonstrate that:

- Use of PG in road construction presents no greater risk than stacking of the material; and
- PG can be safely used in road construction. In scientific terms, the use presents a risk of $< 3 \times 10,000$, the level deemed by EPA to be safe (see discussion below).

3. Information and Certifications Required to Implement EPA Determination

Once the Assistant Administrator decides to approve use of PG in road construction under 40 C.F.R. 61.206(c), each of the reporting and records requirements at §§ 61.206(d) and 61.207-209 must be met. The only limitation on these requirements is that certain record-keeping obligations at § 61.209 may be waived. These reporting requirements include reporting the annual average radium-226 concentration at the removal location, and certification documenting purchaser, quantity and use information, along with a requirement that records must be retained for five years. These requirements ensure that EPA records contain information under §61.206(b) and in any event ensure that PG use and distribution is closely managed even where it is removed from a stack for an approved use.

⁴⁵ Basic concepts and definitions to aid the reader’s understanding of the Petition can be found in Key Definitions which is a preamble to this Petition.

III. REGULATORY HISTORY AND CHANGING CONDITIONS

A. Regulatory History

1. The Original 1989 NESHAP Rule

Prior to 1989, PG in the United States was used for beneficial purposes, such as constructing roadways and agricultural soil amendments. The 1989 NESHAP rule required that all PG must be placed in engineered above ground impoundments (commonly referred to as “gypstacks”) or in phosphate mines where it can be used as backfill. 40 CFR § 61.202. EPA’s 1989 regulatory analysis was based on an estimate of 66 stacks located in 12 states with two-thirds located in Florida, Texas, Illinois, and Louisiana.⁴⁶

2. Post-1989 Regulatory Developments

After the issuance of the 1989 NESHAP rule, TFI petitioned for reconsideration. EPA agreed to reconsider that portion of subpart R that required that all PG be disposed in stacks or mines.⁴⁷ On June 3, 1992, EPA published a final rule approving PG use as an agricultural soil amendment and for indoor research and creating a framework for approving additional alternative uses.⁴⁸ In particular, EPA approved the use of PG as an agricultural soil amendment as long as the average concentration of radium-226 in the PG does not exceed 10 pCi/g (based on a maximum individual risk of 3 in 10,000 due to the use) and use of PG for research in amounts not to exceed 7,000 pounds. 40 CFR § 61.204-205.⁴⁹

The amended regulations also allowed OAR to approve, on a case-by-case basis, a new use if it is as protective of public health, in both the short and long term, as disposal in a stack or a mine. 40 CFR § 61.206(a)-(c).⁵⁰ In 1992, EPA rejected the use of PG in road construction based on an analysis that assumed a roadway constructed with PG might be abandoned in the future, with a home constructed directly on top of the abandoned roadway with no site preparation (i.e., mixing). This hypothetical scenario included several extreme assumptions that resulted in unrealistic levels of exposure (i.e., it was not a RME).⁵¹ For example, the 1992 EPA BID assumed a 70 year period for the duration of residential exposure for the hypothetical reclaimer exposure scenario even though the 1992 EPA BID used 25 years as the duration of a resident’s exposure for the nearby resident. EPA’s current RME for the duration of residential exposure is 26 years (a 90th percentile of exposure), precisely because “EPA has been criticized for too often

⁴⁶ 1989 Rule, *supra* note 3.

⁴⁷ EPA; NESHAPS for Radionuclides Reconsideration; Phosphogypsum, 55 Fed. Reg. 13,480 (Apr. 10, 1990).

⁴⁸ EPA, National Emission Standards for Hazardous Air Pollutants; National Emissions Standards for Radon Emissions from Phosphogypsum Stacks, 57 Fed. Reg. 23,305 (June 3, 1992) (1992 Rule)

⁴⁹ *Id.* at 23,309, 23,311, 23,316. The volume of PG was increased by a later amendment.

⁵⁰ *Id.* at 23,319.

⁵¹ *Id.* at 23,312.

assuming that future use will be residential” and other unrealistic assumptions.⁵² Also see Appendix 4b: Responses to Second Set of USEPA Questions – Reclaimer.

3. Prior Petitions

On December 22, 2004, EPA “conditionally” approved the Petition of the Florida Institute of Phosphate Research (FIPR) to use PG as cover material in a demonstration landfill test cell project (discussions with EPA on this project were initiated in 2002 and the petition submitted December 9, 2003).⁵³ PG, however, was never used as cover material in a landfill test cell. As TFI understands it, by the time the petition was approved, conditions had changed and the landfill owner withdrew its request.

In 2010, Louisiana State University prepared a proposal to allow the use of PG testing to determine if PG could be used to make coastal zone protection devices.⁵⁴ TFI’s understanding is that this effort proposal did not advance to the submittal of a petition.

These examples illustrate the unwieldiness of EPA’s current approach to approvals for PG use. This has resulted in continued stacking, which has been subject to criticism as an unsustainable practice.

B. Factors Influencing Future Uses of PG

A number of factors influence the future uses of PG:

1. Current requirements to obtain regulatory approval prior to each individual new use slow the process of implementing beneficial, safe new uses. In many other countries, PG use is encouraged over storage and there are little or no regulatory restrictions on the use of PG up to an average radium (226) content of 27 pCi/g.⁵⁵
2. The size, costs and complexity of gypstacks have increased (see, Appendix 6 Economic Analysis of Regulatory Costs Savings) well beyond original expectations. When the stacking solution was developed, two key factors were not fully recognized: (1) growth in the industry would result in a significant increase in the volume of PG material that would require storage capacity in stacks, and (2) the beneficial use for which PG could safely be employed. Today, active stacks are concentrated in Florida, Idaho, Louisiana, and North Carolina and contain at least 1.7 billion tons of stored PG. EPA’s final rule did not anticipate the significant increase in production that would occur, creating a need for new storage capacity to handle the

⁵² EPA, EPA Land Use in the CERCLA Remedy Selection Process, OSWER Dir. No. 9355.7-04, 3 (May 25, 1995), available at <https://www.epa.gov/sites/production/files/documents/landuse.pdf> (Land Use in the CERCLA Remedy Selection Process).

⁵³ Holmstead FIRP Letter, *supra* note 7.

⁵⁴ Louisiana State University, Preparation of an Application for Approval to Use Stabilized Phosphogypsum as a Fill Material For Coastal Protection Devices, Final Report, Pub. No. 01-197-235 (Apr. 2010), available at <http://fipr.state.fl.us/wp-content/uploads/2014/12/01-197-235Final.pdf>.

⁵⁵ IFA Sustainable PG Management Report, *supra* note 12.

PG production rate of 46 million tons per year. As a result, EPA's 1989 final rule and its underlying analysis did not consider the full extent of present (and future) environmental impact and cost of long-term stack storage on a scale compatible with modern fertilizer production facilities.

3. Historically, EPA considered the radium-226 concentrations in individual phosphogypsum samples as ranging from 1.4 to 46 pCi/g.⁵⁶ At EPA's request, TFI members performed radiation sampling on gypstacks across the U.S. in 2019 to provide updated information (Appendix 5). Multiple stacks owned and operated by three companies were sampled (ten samples per stack were taken). The 2019 sampling found:⁵⁷

- Radium (226) concentrations of individual PG samples ranged 6.3 to 27.9 pCi/g.
- The average radium (226) concentrations of all 90 PG samples from all stacks is 18.6 pCi/g.
- The average radium (226) concentrations per stack ranged from 7.46 pCi/g to 24.7 pCi/g. An EPA 1988 report states the mean concentrations of radium (226) from Florida stacks ranged from 25 to 34 pCi/g.
- The average average radium (226) concentrations from PG samples taken from six Central Florida stacks is 19.6 pCi/g and for the Western US stacks is 15.8 pCi/g.
- Limited data reported in the literature on the concentrations of radium (226) in PG outside of the U.S. indicate that concentrations range from 6.7 pCi/g to 38.4 pCi/g, well below 148 pCi/g that corresponds to a risk of 3 in 10,000 (N.B.: Some data are average concentrations and others report as few as one sample).

The 2019 data demonstrate that the average radioactivity level for each stack is significantly lower than the 35 pCi/g radium (226) concentration limit requested in the Petition and less than 148 pCi/g which corresponds to EPA's safe risk level of 3 in 10,000. All of 2019 stack averages are below 27 pCi/g (the nominal concentration used in the risk assessment), thus, the risk for these stacks is below 0.5 in 10,000.⁵⁸

⁵⁶ EPA 1992 BID, *supra* note 15.

⁵⁷ TFI 2019 Sampling, *supra* note 41, at 1-5.

⁵⁸ The Risk Assessment found that the nominal level of radium (226) assumed for calculation purposes to be contained in PG (27 pCi/g) corresponds to a maximum risk of 0.5 in 10,000. Thus, the EPA PG risk management limit of 3 in 10,000 corresponds to a level of 148 pCi/g in PG (using the non-rounded risk for the construction worker). Therefore, PG may be safely used as road construction material.

4. The scientific community has developed an updated understanding of relative risks associated with PG.⁵⁹ This Petition has been prepared to enable EPA's regulatory decision to be based on the current, best scientific understanding of radiation protection and management related to PG use. The International Atomic Energy Agency (IAEA), an international organization which the U.S. helped establish to provide a scientific source of recommendations on radiation issues, has determined that radionuclide activity concentrations in PG material are less than 1 Bq per gram (Bq/g) (which corresponds to 27 pCi/g) "implying that it is not necessary to regulate."⁶⁰ Section IV below summarizes this updated understanding. U.S. and international research, as well as data from uses in developed nations, are now available to support various PG uses and demonstrate that PG use is at least as protective of public health as storage in stacks. More than a dozen beneficial uses have been analyzed worldwide, resulting in significant, successful PG use applications in at least 21 countries.⁶¹

Further, U.S. risk assessment approaches have changed based on experience and evolving environmental management policies since the 1980s, along with increased awareness of product lifecycles and sustainability. These changed conditions enable a more thorough and appropriate evaluation of PG use in road construction, and a demonstration that this use is protective of human health and the environment.

5. EPA policies encourage use and recovery of high-volume, low-risk waste. EPA's 1989⁶² and 1992⁶³ risk management decisions concerning PG uses acknowledge, but do not provide, an effective mechanism to implement PG use decisions that are consistent with the Agency's overarching policy of supporting recycling. Since 1992, EPA has increased its emphasis on understanding product lifecycles and has adopted sustainability policies and encouraged sustainable practices.

6. The economics of gypstacks have changed. The cost to stack PG and manage gypstacks is increasing. These rising costs are a concern to U.S. phosphate fertilizer producers that must remain competitive in a global marketplace. Fertilizer companies outside the U.S. may use or sell for use their PG material safely utilizing the IAEA standards and avoid costs attendant to stacking. This puts U.S. companies at a significant economic disadvantage. The international community has actively moved in the direction of safe PG use and recycling, creating an increasing competitive

⁵⁹ See International Atomic Energy Agency (IAEA), Radiation Protection and Management of NORM Residues in the Phosphate Industry, Safety Reports Series No. 78 (2013), available at https://www-pub.iaea.org/MTCD/Publications/PDF/Pub1582_web.pdf (Radiation Protection and Management of NORM Residues).

⁶⁰ *Id.* at 56. This statement does not in any way preclude a risk based determination that higher levels might also be acceptable.

⁶¹ IFA Sustainable PG Management Report, *supra* note 12.

⁶² EPA, Comments and Response to Comments, NESHAP, National Emission Standards for Radon Emissions from Phosphogypsum Stacks, EPA-402-R-98-007, 3 (1998).

⁶³ 1992 Rule, *supra* note 48, at 23,306.

disadvantage for U.S. industry, particularly when one considers the costs associated with gypstack maintenance, closure, and long term care.

7. Perceptions of gypstacks have changed. EPA's final rule did not anticipate adverse public sentiment from local stakeholders regarding the long-term presence of gypstacks, including aesthetic concerns. Some local governments and communities have expressed a preference for use of PG in a manner that encourages redevelopment of land currently utilized by and around gypstacks.⁶⁴ Such use increases economic development by generating jobs associated with the transportation and use of PG, and frees up land for other uses (Appendix 6).

8. TFI's proposal represents a significant regulatory burden reduction that will create new commercial markets, industries and jobs. This is in the context of the dramatic increase in PG use worldwide since 2008, from a baseline of close to zero to 35-40 million tons consumed worldwide by 2015.⁶⁵ To make comparable advancements, the U.S. phosphate industry, EPA approval of TFI's Petition would support the industry's sustainable development goals by expanding the list of PG beneficial uses and ameliorate substantial, avoidable regulatory burdens and costs imposed by the NESHAP Subpart R regulations.

IV. SUMMARY OF THE EVALUATIONS CONDUCTED FOR THE PETITION

A. Overview

EPA's document, titled "Applying to EPA for Approval of Other Uses of Phosphogypsum: Preparing and Submitting a Complete Petition under 40 CFR 61.206, A Workbook" (EPA PG Workbook) provides a guide for the Petition.⁶⁶ The key requirement expressed in this guidance (and the NESHAP) is that in responding to any proposed petition, EPA must decide whether the radiological risk associated with the alternative use poses no greater risk than placement in stacks.⁶⁷

The decision concerning whether the radionuclide risk associated with PG in alternative uses is acceptable depends upon many risk analysis elements, including:

- The specific exposure scenarios that are determined to be appropriate. This Petition seeks approval of the use of PG in road construction based on a risk analysis for a series of specific exposure scenarios;

⁶⁴ See e.g., *EPA holds meeting about Mississippi Phosphate Site*, St. Louis Post-Dispatch, Jan. 11, 2018, available at https://www.stltoday.com/news/world/epa-holds-meeting-about-mississippi-phosphate-site/html_0a41e1fa-96ef-54bb-a825-8fcaeb4b4463.html (comment of Pasagoula Mayor, Dane Maxwell, at an EPA public meeting regarding the Mississippi Phosphate site cleanup: "We want it clear and ready for development as soon as possible").

⁶⁵ See IFA Sustainable PG Management Report, *supra* note 12.

⁶⁶ EPA PG Workbook, *supra* note 43, at 13.

⁶⁷ *Id.* at 12.

- The RME exposure assumptions or parameters that are selected to estimate a high end radiation dose estimate during the alternative use of PG, i.e., an assumption likely to overestimate exposure. This Petition developed RME exposure assumptions for each exposure scenario and receptor based on high end construction design features that may affect the radiation dose and calculated a high end RME dose;
- The radiation dose to risk conversion factor used, see Attachment A;
- The cancer risk estimate based on RME exposure assumptions and the radiation dose to risk conversion factor of 5 in 10 million mrem;
- EPA's cancer risk limit for new PG uses of 3 in 10,000 during the use;
- A comparison of the estimated cancer risk to EPA's risk limit for new PG uses; and
- EPA's Risk Management Decision considering economic and other risk management factors.

EPA did not assess chemical risk from residual metals in its 1989 risk assessment or its 1992 risk assessment (which approved an agricultural use and denied approval to use PG for road construction).⁶⁸ In the 1992 EPA BID risk assessment, EPA stated that PG “contains some trace metals in concentrations which the EPA believes may pose a potential hazard to human health and the environment,” particularly arsenic, lead, cadmium, chromium, fluoride, zinc, antimony, and copper.⁶⁹ The “trace metals also may be leached... and migrate to nearby surface and groundwater resources.”⁷⁰ However, EPA explicitly decided in the 1992 EPA BID that these metals “will not be addressed in the risk assessment.”⁷¹ Thus, neither the 1992 EPA BID risk assessment for the approved use of PG as an agricultural amendment nor the 1992 risk assessment for use of PG in road construction (which was not approved) included a risk assessment or a screening level assessment for metals in PG.

For this Petition, however, EPA requested that TFI perform a risk screening level evaluation for the naturally-occurring radioactivity and metals. Although there is a question concerning whether EPA's NESHAP program has the legal authority to require an risk assessment of the impact of metals in PG used for road construction, TFI performed a high end exposure (i.e., RME or higher exposure) for the human health risk screening. That screening assessment concluded that the metals levels in PG are not expected to pose an unacceptable level of health risks to construction workers or cause an unacceptable impact in groundwater using PG in roadway construction. Thus, no further risk evaluation is warranted to assess risks from metals in PG used for road construction. Furthermore, proper construction practices employ BMPs such

⁶⁸ EPA 1992 BID, *supra* note 15. 1992 Rule, *supra* note 48, at 23,305.

⁶⁹ EPA 1992 BID, *supra* note 15, at 2-8.

⁷⁰ *Id.*

⁷¹ *Id.*

as wetting surfaces to reduce dust formation, and these measures serve to further lower exposure. Studies and the nature of the petitioned PG use in road construction material compacted or encapsulated below pavement and above the water line indicate that leaching to groundwater (or surface water) is unlikely (ie., it is not a complete exposure pathway that warrants a more detailed risk assessment of the metals). The relevant Department of Transportation has responsibility to ensure that construction, using any construction materials (including PG), is to conduct construction activities in a manner that is protective of human health and the environment.

B. Exposure Scenarios

1. Overview

PG use was considered for road construction. This led to the development of the following RME exposure scenarios evaluated in the risk assessment:

- Road Construction Worker who builds roads exclusively with PG material for five years;
- Road User who routinely commutes on the constructed roadway by vehicle, motorcycle or bicycle for 26 years (motorist/bicyclist was deemed most conservative);
- Nearby Resident who lives in a home located 50 feet or more from a PG roadway for 26 years. To illustrate the amount of exposure reduction with distance, exposure to a resident who resides 20 feet from the PG roadway for 26 years was also calculated;
- Truck Driver who delivers PG for road base material to a construction site for five years; and
- Utility Worker who excavates across a PG roadway during utility maintenance projects and is exposed in a trench for 160 hours in a year.

These exposure scenarios were selected based on a review of prior regulatory submissions as well as discussions with EPA personnel, and the best professional judgment of the scientists assisting in the preparation of the Petition.⁷² This analysis includes receptors not utilized by EPA in its 1992 BID risk assessment but added at EPA's request during the working sessions to fully evaluate public health.

This Petition also includes, at EPA's request, a hypothetical scenario which assumes a home is built upon an abandoned road constructed with PG (the so called Reclaimer scenario), which results in an extreme exposure (Extreme Reclaimer), i.e., the exposure is much higher than a RME exposure scenario. The probability of this scenario is very remote and implausible in that this construction scenario would likely never occur under existing road construction practices

⁷² Arcadis (a firm specializing in design and consultancy for natural and built assets) and Exponent (an engineering and scientific consulting firm).

and constraints on future land use for public infrastructure and therefore, the assumed scenario is not reasonably likely (Appendix 4b: Responses to Second Set of USEPA Questions - Reclaimer). Although this scenario also meets the EPA risk management limit of 3 in 10,000, it is not a reasonably likely scenario and therefore should not represent a condition of approval.

The design and construction of roadways is governed by policies and constraints on future land use associated with public infrastructure. The Reclaimer scenario of building a house on top of an abandoned roadway is not consistent with typical land re-use and sustainability policies, is limited by the legal constraints on abandoning public roads, is extremely rare (research has found few, if any, examples), and ignores the economic factors favoring using existing roads even if the land is being redeveloped. Therefore it is not a reasonably anticipated land use.

Nevertheless, EPA requested this evaluation to provide historical context for the 1992 EPA BID and confirm that this scenario is not a logical concern. This is discussed in further detail in Section IV (D)(9), below.

2. Reasonable Maximum Exposure (RME)

In order for there to be a risk, there must be exposure. EPA uses an RME metric to assess exposure risk. The “intent of the RME is to estimate a conservative exposure case (i.e., well above the average case) that is still within the range of possible exposures.”⁷³ Each exposure factor used to estimate the RME should be selected “so that the resulting estimate of exposure is consistent with the higher end of the range of plausible exposures” (citing EPA’s 1991 guidance).⁷⁴

A National Academy of Science (NAS) Committee reviewing EPA’s regulation of technologically enhanced naturally occurring radioactive material (TENORM) recommended that EPA “should use exposure and dose risk assessments that are ‘reasonably realistic’” in developing standards for exposure to the various types of low level naturally occurring radiation.⁷⁵ “The Committee defined ‘reasonably realistic’ as ‘not...intended to greatly overestimate or underestimate actual effects for the exposure situation of concern,’” and EPA agreed with the Committee’s recommendations.⁷⁶

The exposure calculations in the Petition use currently accepted radiation modeling methods such as RESRAD and MicroShield. State regulators, citing to EPA guidance, note that “if high-end values are chosen for every exposure factor, then the resulting exposure estimate may no longer be consistent with the RME and may exceed the realm of possibility altogether.”⁷⁷

⁷³ EPA Risk Assessment Guidance for Superfund, *supra* note 10, at 7-1. *See also* ITRC, Decision Making at Contaminated Sites, *supra* note 10.

⁷⁴ *Id.* at 6.1.1.

⁷⁵ EPA, Report to Congress, Evaluation of EPA’s Guidelines for Exposures to Technologically Enhanced Naturally Occurring Radioactive Materials (TENORM), EPA 402-R-00-01, 15 (June 2000), *available at* <https://www.epa.gov/sites/production/files/2015-04/documents/402-r-00-001.pdf> (describing a National Academy of Sciences report on TENORM) (EPA Report to Congress Re: TENORM).

⁷⁶ *Id.*

⁷⁷ ITRC, Decision Making at Contaminated Sites, *supra* note 10, at 6.1.1.

The use of reasonable exposure assumptions is supported by the courts, which have long held that exposure assumptions “must bear some rational relationship” to actual conditions, and disallowed unduly conservative approaches. For example, a court rejected EPA’s use of an extreme assumption - that a child eats sludge applied to roadside cemeteries every day for a five year period.⁷⁸

Scenario-specific exposure assumptions were selected for this analysis in accordance with EPA guidance and methodology (see Table 3 below). These exposure assumptions are contained in appendices and accompanied by detailed scientific support, citations to guidance, discussion of best professional judgment and prior precedent used to make the selections. A summary of key exposure assumptions is provided in Table 3 below.

Table 3: Summary of Key Exposure Assumptions

Person	Description	Years	Model	Rationale
RME Scenarios				
Road Worker	Builds roads exclusively with PG material	5	RESRAD	The worker who uses PG to build a road is closest to the PG mixtures in road base and/or paving. Used Florida Department of Transportation construction project data and EPA guidance. Other road construction workers have lower exposure and therefore less risk.
Truck Driver	Delivers PG to the construction site to be used in road base and/or paving materials	5	MicroShield	A truck driver hauls PG to the road construction site for 5 years (the truck body provides some shielding).
Nearby Resident	Resident lives in a home located 50 feet or more from a road	26	MicroShield	EPA guidance on exposure values. To illustrate the amount of exposure reduction with distance, exposure to a resident who resides 20 feet from the PG roadway for 26 years was also calculated.
Road User	Resident drives on the road in a vehicle, or on a motorcycle or bicycle (the motorist/bicyclist is evaluated as the most conservative)	26	RESRAD	EPA guidance on exposure values.
Utility Worker	Worker in trench dug across a PG roadway (e.g., utility work)	160 days	MicroShield	Best professional judgment, based, in part, on limited time trenching occurs (since, among

⁷⁸ *Leather Indus. of America v. EPA*, 40 F.3d 392, 405 (D.C. Cir. 1994).

				other reasons, it obstructs traffic).
--	--	--	--	---------------------------------------

At EPA's request, the Petitioner provided a "reclaimer scenario" (an assessment of the extreme hypothetical exposure if the road is abandoned and a house is constructed on the abandoned roadbed (see Table 4)).

Table 4: Reclaimer Scenario Exposure Assumption
(see the Petition's Risk Assessment and Appendix 4b: Responses to Second Set of USEPA Questions – Reclaimer)

Hypothetical Extreme Exposure Reclaimer Use Scenario				
Reclaimer Resident	Home constructed on an abandoned road	26	RESRAD (for gamma) Spreadsheet for radon	The abandonment of a road and construction of residential housing at the location is an extremely unlikely event included to evaluate the lifecycle and ultimate disposition of a PG road and is not a RME exposure. See discussion at Section IV(D)(9), below.

The RME is used to calculate the dose (i.e., the amount of radiation that the individual in the exposure scenario receives over a particular unit of time). In our situation, the annual and total doses depend on the length of time exposure occurs for that exposure scenario. Different exposure scenarios have different lengths of exposure. Risk is assumed to increase in direct proportion to the RME dose (i.e., if the RME dose increases by a factor of two, the risk increases by a factor of two).

The risk is then compared to the EPA risk management levels. EPA has long utilized (and courts have long upheld) the principle that a 1 in 10,000 risk level is "safe," although "[t]he upper boundary of the risk range [i.e., the 1 in 10,000 risk level] is not a discrete line."⁷⁹ As a unanimous *en banc* ruling of the Court of Appeals for the District of Columbia Circuit candidly noted, the basis for claiming harm from exposure to chemicals at extremely low environmental levels is more a function of "the rules of arithmetic rather than because of any knowledge" and there was "no particular reason to think that the actual line of the incidence of harm is represented" by the assumption selected by EPA.⁸⁰

This acknowledgment is also apt for the risks from radionuclides. EPA's guidance for new uses of PG states unequivocally that for new PG uses to be approved, a petitioner must demonstrate that the cancer risk to those exposed to phosphogypsum as a result of proposed use "must not be

⁷⁹ EPA, Role of the Baseline Risk Assessment in Superfund Remedy Selection Decisions, OSWER DIRECTIVE 9355.0-30, 2 (Apr. 22, 1991), available at <https://www.epa.gov/sites/production/files/2015-11/documents/baseline.pdf>.

⁸⁰ *Natural Resources Defense Council, Inc. v. U.S. EPA*, 824 F.2d 1146, 1165 (D.C. Cir. 1987).

more than three in ten thousand” (i.e., 3×10^{-4} or 3 in 10,000).⁸¹ In the radionuclides NESHAP, EPA primarily, but not exclusively, evaluated the maximum individual risk (MIR) (which is the added chance of a cancer) and compared it to the NESHAP risk management level of 3 in 10,000.⁸²

The use of the 3 in 10,000 “risk threshold is consistent with the determination of a ‘safe’ level first announced in the NESHAP for certain benzene source categories (54 FR 38044, September 13, 1989).”⁸³ As noted above, in the 1989 radionuclide rulemaking, EPA determined that six radionuclide source industries presented a cancer risk higher than 1 in 10,000 but that nonetheless was “essentially equivalent” to EPA’s safe risk level “in light of the numerous uncertainties.”⁸⁴ Similarly, EPA reaffirmed in 1992 that a 3 in 10,000 risk level was protective of human health and consistent with EPA’s long-standing risk management goals.⁸⁵ In particular, EPA “determined” that the 3 in 10,000 risk level provided “an ample margin of safety, considering the cost, scientific uncertainty, and technological feasibility of control technologies needed to further reduce the radon emissions from [the PG] stacks.”⁸⁶

In summary, EPA explicitly has determined that the 3 in 10,000 cancer risk for radionuclides (including PG) is safe, consistent with overall EPA risk management policy. EPA has concluded that the “proposed other use will not cause a threat to the public or environment greater than if the phosphogypsum were stored in the stack,” if the risk is not “more than three in ten thousand [3 in 10,000].”⁸⁷

The relationship between exposure dose and risk is further elaborated on in Appendices 1 and 2.

C. International Commission of Radiological Protection (ICRP) Dose to Risk Relationship

The risk assessment selected in this Petition is the ICRP dose to risk conversion factor. The ICRP sets out the basis for evaluating health effects from radiological exposure along with recommendations for using specific values for regulatory purposes. While there are broad uncertainty bounds at low-dose exposures, the assumption of a linear relationship between exposure and risk is maintained regardless of the possibility of a threshold below which there is

⁸¹ EPA PG Workbook, *supra* note 43, at 13.

⁸² 1989 Rule, *supra* note 3, at 51,654, 51,659, 51,660. In this context, the risk distribution (i.e. the range of risks to which the population is exposed) decreases as distance to the road increases, for PG use in road construction. Relatively quickly the dose falls below the dose that corresponds to background. The exposure to the residents is below the 3 in 10,000 safe level.

⁸³ EPA PG Workbook, *supra* note 43, at 5.

⁸⁴ 1989 Rule, *supra* note 3, at 51,654, 51,664, 51,666, 51,668-69, 51,677, 51,682. Risks ranged between 1 in 10,000 and 3 in 10,000. *Id.*

⁸⁵ 1992 Rule, *supra* note 48, at 23,305, 23,311-12, 23,316.

⁸⁶ EPA PG Workbook, *supra* note 43, at 5.

⁸⁷ *Id.* at 13.

no risk. In Publication 103, ICRP provides an analysis of the exposure values considered in that analysis. On the basis of model uncertainty and epidemiological evidence, the ICRP recommends a dose-to-risk coefficient of 5% per Sievert (one Sievert is equivalent to 100 rems or 100,000 mrem, see explanation of terms in Attachment A).⁸⁸ This coefficient is the basis for current international radiation safety standards, and is considered by ICRP to be “appropriate for the purposes of radiological protection.” Although it is based on cancer mortality as the endpoint, it is also approximate for all calculated detrimental effects.

For our risk analysis, we use a dose conversion expressed in terms of millirems or mrem.⁸⁹ Translating the 5% risk per Sievert recommended by the ICRP for regulatory purposes yields 5×10^{-7} risk per mrem.

The risk assessment submitted as part of this Petition estimates the annual dose for each of the exposure scenarios, summed over the associated years of exposure, to provide a total dose that is then converted to a cancer risk using a dose-to-risk conversion factor of 5×10^{-7} risk per mrem (i.e., 5/10,000,000).

Our use of 5×10^{-7} as a conversion factor is consistent with EPA risk assessment procedures.⁹⁰ The EPA’s 2011 guidance provides cancer risk factors for uniform whole-body exposures of low-dose gamma radiation to the entire population, and reports an estimated 90% confidence interval for cancer mortality of 2.8% to 10% per Gy⁹¹ (i.e., from 2.8×10^{-7} to 10×10^{-7} per mrem).⁹² This range is essentially the same dose to risk conversion range derived by ICRP.

The value we use is also consistent with the perspective of the National Council on Radiation Protection and Measurements (NCRP) (the U.S. organization chartered by the U.S. Congress in 1964 to, among other things, “develop ... recommendations about ... protection against radiation” (i.e., NCRP uses the same dose to risk conversion factor as in the 2007 ICRP)).⁹³

⁸⁸ International Commission on Radiological Protection (ICRP), The 2007 Recommendations of the International Commission on Radiological Protection, ICRP Publication 103, 55, 87 (2007), available at <https://www.icrp.org/publication.asp?id=ICRP%20Publication%20103> (2007 ICRP Recommendations).

⁸⁹ The mrem is a common unit of radiation dose. In this report, “dose” refers to effective dose, which simply means that when a person is exposed to a uniform radiation (e.g., external gamma radiation), all of the doses to the different organs are weighted by their radiosensitivity and added together. See Appendices 1 and 2 for more detailed discussion of the definitions and application of these factors.

⁹⁰ Similarly, the international community has widely adopted the International Atomic Energy Agency (IAEA) determination that 1 millisievert (1 mSv) per year is the acceptable level of radiation exposure (for example, the European Union [EU] regulations). See Radiation Protection and Management of NORM Residues, *supra* note 59, at 165. The IAEA and EU determinations are also based on the International Commission on Radiological Protection. 2007 ICRP Recommendations, *supra* note 88, at 55, 97, Table 5, 116, and Table 8.

⁹¹ For practical purposes as to gamma radiation, $1 \text{ Gy} = 1 \text{ Sv} = 100 \text{ rem} = 100,000 \text{ mrem}$.

⁹² EPA, EPA Radiogenic Cancer Risk Models and Projections for the U.S. Population, EPA 402-R-11-001 (April 2011), available at <https://www.epa.gov/radiation/epa-radiogenic-cancer-risk-models-and-projections-us-population> (EPA Radiogenic Cancer Risk Models and Projections for the U.S. Population),

⁹³ National Council on Radiation Protection and Measurements, Management of Exposure to Ionizing Radiation: Radiation Protection Guidance for the United States, NCRP Report No. 180, 42 (2018), available at <https://ncrponline.org/shop/reports/report-no-180-management-of-exposure-to-ionizing-radiation-radiation-protection-guidance-for-the-united-states-2018-2018/> (Management of Exposure to Ionizing Radiation).

The ICRP analysis was also relied upon by the European Union (EU) in selecting its general population acceptable dose level.⁹⁴ The EU appointed a group of experts to provide advice on the basic safety standards, taking into account the 2007 recommendations of the ICRP (specifically, ICRP Publication 103 since the ICRP reflected “new scientific evidence and operational experience”).⁹⁵

The most recent report of the NCRP (2018) (Report No. 180) provides a detailed discussion of the risks from exposure to ionizing radiation and states that “[t]he value of 5 % Sv⁻¹ [i.e., 5/10,000,000 per mrem] is a rounded value for radiation detriment used to inform all the NCRP recommendations regarding stochastic effects,”⁹⁶ (emphasis added).

In summary, the use of the ICRP dose to risk relationship is scientifically sound and supported by many independent governmental entities, including EPA and NCRP. We elaborate further in Appendices 1 and 2. The “conservative” nature of the assumptions underlying the dose to risk relationship and associated uncertainties are discussed below.

For the reasons noted above, the risk estimates derived for PG using the ICRP dose to risk conversion factor are based on a linear relationship between dose and risk for the very low dose exposures derived for this report. Therefore, they are appropriate for use in the Petition and can be relied upon by EPA in its decision making.

D. Calculation of Risk that Corresponds to the RME

This section summarizes the RME doses calculated in the Risk Assessment and explains generally how they are derived.

1. Deriving Dose for the Period of Use

A dose is the cumulative amount of radioactivity absorbed (weighted to take into account the different medical impacts of different types of radiation). The dose is calculated using the RME associated with each scenario.

Duration is specific to the exposure scenario. For a resident, the exposure period is 26 years based on standard EPA guidance.⁹⁷ For a road construction worker, the length of exposure is

⁹⁴ ICRP is an international expert advisory body that offers its recommendations to regulatory and advisory agencies, mainly by providing guidance on the fundamental principles on which appropriate radiological protection is based. The 2007 recommendation was produced “after eight years of discussions, involving scientists, regulators, and users all around the world.” 2007 ICRP Recommendations, *supra* note 88, at 3.

⁹⁵ Official Journal of the European Union, Council Directive 2013/59/Euratom, 4 (Dec. 5, 2013), available at <http://eur-lex.europa.eu/legal-content/EN/TXT/PDF/?uri=OJ:L:2014:013:FULL&from=EN.L 13/2 COUNCIL DIRECTIVE 2013/59/EURATOM> (setting forth basic safety standards for protection against the dangers arising from exposure to ionizing radiation, and repealing Directives 89/618/Euratom, 90/641/Euratom, 96/29/Euratom, 97/43/Euratom and 2003/122/Euratom) (Council Directive 2013/59/Euratom).

⁹⁶ Management of Exposure to Ionizing Radiation, *supra* note 93.

⁹⁷ 26 year exposure duration for residence – 90th percentile recommended by EPA. EPA, Human Health Evaluation Manual, Supplemental Guidance: Update of Standard Default Exposure Factors, OSWER Directive 9200.1-120

five years (based on data from roadway construction projects, DOT manuals, and EPA guidance (see Petition's Risk Assessment (Appendix 2) and discussed in more detail in Appendix 4a: Response to EPA Comments on January 16, 2020, and below in this Petition, Section V). The risk assessment determined that the 3 in 10,000 risk level corresponded to a total cumulative dose of 600 mrem and this value can be used to judge the magnitudes of exposure for each scenario. Table 5 below summarizes the exposure doses calculated in the risk assessment on an annual and scenario basis.

Table 5: Total Dose Summary

Person Exposed	Annual Dose	Years	Total Use Exposure Dose (mrem)
Road Worker	22 mrem	5	110
Truck Driver	18.6 mrem	5	93
Nearby Resident	multiple exposures over 26 years	26	16
Road User	1 mrem	26	28
Utility Worker	0.8	160 hours in 1 year	0.8

2. Converting the Total Use Dose to Risk

Radiation risk for cancer is calculated as the product of the RME exposure dose for each scenario and the dose-to-risk conversion factor. The distance from the road and durations of exposure are key considerations in calculating the total dose risk. While the RME is designed to bound these, most residents would be located at greater distances from the road and/or experience shorter durations of exposure than the RME individual. Thus, actual doses for the populations would be less than those presented here.

As noted above, using a dose-to-risk conversion factor of 5×10^{-7} risk per mrem, 600 mrem corresponds to a 3 in 10,000 risk level. From this relationship, one can calculate the risk for a particular dose. The result of the risk calculations are summarized in Table 6 below. The results of the calculations are provided in Appendices 1 and 2 of this Petition.

Table 6: Total Use Dose and Risk Table Compared to Background

RME Exposure Scenario	Total Use Dose (mrem)	Years	Risk From the Use
Road Construction Worker	110	5	0.5 in 10,000
Truck Driver	93	5	0.5 in 10,000
Road User	28	26	0.1 in 10,000
Nearby Resident	16	26	0.08 in 10,000
Utility Worker	0.8	160 hours in 1 year	0.004 in 10,000

(Feb. 6, 2014), available at https://www.epa.gov/sites/production/files/2015-11/documents/oswer_directive_9200.1-120_exposurefactors_corrected2.pdf (Update of Standard Default Exposure Factors).

3. Road Construction Worker Risk

Based on the assessments provided in this Petition, the highest estimated RME exposure is for the road construction worker placing road base containing PG that contains radium -226 at 27 picocuries per gram. The exposure dose amounts to ~22 mrem/year (which results in a 110 mrem total dose for the exposure period of five years). This dose corresponds approximately to an incremental cancer risk of 0.5 in 10,000, which is over 5 times less than the PG use risk management level of 3 in 10,000.

4. Risk to the Nearby Resident

In addition to the highest risk individual (a road construction worker), the risk assessment also evaluated the exposure doses and risk to a resident who may live immediately adjacent to the road. Consideration was given to all stages of life from childhood through adult. Exposure depends on distance, with exposures dropping off quickly as distance from the road increases. Nevertheless, for people living immediately adjacent to the road, the exposures and risks are well below the risk management level of 3 in 10,000.

The exposure doses and risks were estimated without considering shielding during the period of construction; shielding was included when estimating doses following construction of the road. Shielding of residents was afforded by the road surface as well as by embankments and other structures that cover the sides of the road base.

The cumulative incremental dose associated with living in a house adjacent to a road with a PG base is 16 mrem and the associated risk is 0.08 in 10,000. These RME exposure dose and risk estimates to nearby residents are well below the EPA risk management levels.

5. RME Risk from the Other Exposure Scenarios

Doses and associated risks for all other RME exposure scenarios (the truck driver delivering the PG, the users of the road, and the utility worker in a trench near the road) are lower than those for the road construction worker (see Table 1 and 6).

6. RME Exposures/Risks, by Definition, are the Highest Exposures

All exposure scenarios have doses and risks that are less than the EPA's risk management levels. The RME risks are constructed to overestimate rather than underestimate the actual risks and this provides confidence for making decisions that are health protective.

Other workers who are more distant from the PG have lower exposures than the construction worker (and, therefore, lower risk). Similarly, most residents living near roadways are exposed to lower risk levels and most PG will contain lower radiation levels used in this calculation. Moreover, the dominant source of dose is gamma radiation which decreases with distance and hence, residents who live more than 50 feet from a road will receive a lower dose (and consequent risk) than the RME at a distance of 50 feet from the edge of the road.

A summary of the risk distribution provided in Table 2, above (which is from Appendix 4a).

In summary, the risk distribution from road construction is negligible, beyond the individuals who are on or immediately beside the road, as assessed in the Risk Assessment document.

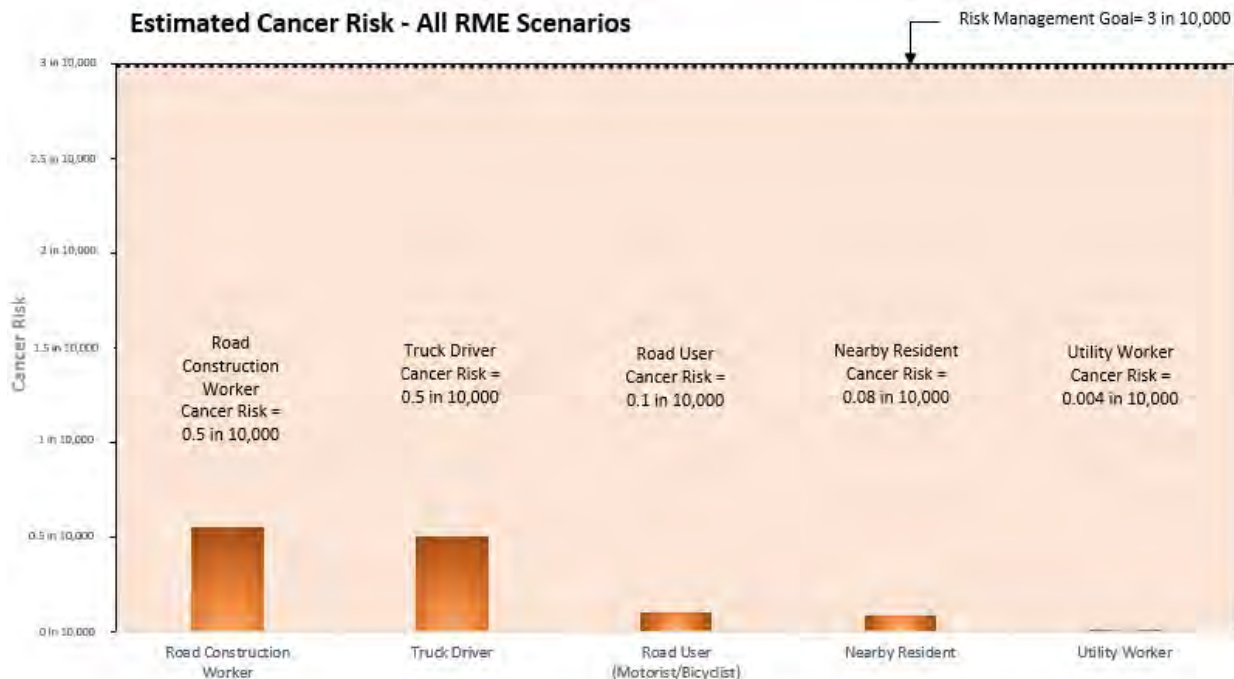
7. Comparison to Background

Because radiation is always present naturally, it is helpful to compare the incremental radiological exposures to background levels to provide important perspective. While natural background varies geographically (between states and even within states), a value of approximately 310 mrem a year was used for comparison because it is a widely used national background level. Background radiation varies naturally from ~100 mrem to 1,000 mrem. Thus, the ratio of total use exposure to background will vary depending upon the location of the road (see Table 1 below and provided above). Given the conservative nature of the exposure estimates, these incremental exposures would likely be within the variability of measurement for ambient radiation.

Table 1: Dose, Risk, and Background Summary for All RME Scenarios (repeated for the convenience of the reader)

Receptor	CSM	Exposure Duration (years)	Exposure Dose (mrem)	Estimated Cancer Risk	Background Dose from Exposure Duration (mrem)	Exposure Dose Percentage of Background Dose (%)
Reasonable Maximum Exposure Scenarios						
Road Construction Worker	PG in Road Base	5	110	0.5 in 10,000	1550	7%
Road User (Motorist/Bicyclist)	PG in Road Base & Surface	26	28	0.1 in 10,000	8060	0.3%
Truck Driver	PG-containing material for Road Base	5	93	0.5 in 10,000	1550	6%
Nearby Resident	PG in Road Base & Surface	26	16	0.08 in 10,000	8060	0.2%
Utility Worker	PG in Road Base	1	0.8	0.004 in 10,000	310	0.3%
EPA Cancer Risk Management Goal			600	3 in 10,000	600	

Estimated cancer risk below this goal.

Figure 4: Estimated Cancer Risks

8. Disposition Scenario

The EPA PG use regulations require an assessment of the risk from the ultimate disposition of PG for any product in which the PG is incorporated.⁹⁸ The RME for the ultimate disposition of a new road constructed with PG is that it serves as an established part of municipal (county, state, or federal) infrastructure and as such would require periodic repair and expansion as needed. Road maintenance activities include removing the surface, grinding and reusing or disposing of the materials consistent with federal, state, and local regulations. Exposures and risks associated with maintenance of roads and reuse of construction materials are expected to be comparable to or less than those detailed in the risk assessment for road construction (Appendix 4a: Response to EPA Comments on January 16, 2020).

9. Extreme Hypothetical Reclaimer Requested By EPA (> RME)

Our evaluation is that, in light of current policies and known constraints on future land use for public infrastructure, a hypothetical reclaimer scenario does not represent a reasonably foreseeable future use for inclusion in the risk analysis for this Petition (Appendix 4b: Responses to Second Set of USEPA Questions - Reclaimer).⁹⁹

The reclaimer scenario used in the 1992 BID Risk Assessment as a reasonable disposition scenario (without any explanation or scientific support) was the assumption that a house is built

⁹⁸ 40 C.F.R. § 61.206 (a)(8)(1).

⁹⁹ Memorandum from TFI to Lee Veal, Director, Radiation Protection Division, U.S. Environmental Protection Agency (April 24, 2019). This detailed memorandum explains the reasons that the Reclaimer Exposure Scenario is not a RME.

on the roadbed at some future time after the road is closed and the road surface has crumbled and been removed. (EPA 1992 BID, p. 4-10). This was not an RME disposition scenario then, nor is it realistic now.

First, a diligent search has not found any documentation of paved roads being abandoned and residential housing being constructed immediately on the abandoned pavement.¹⁰⁰

If there are any examples, they are rare (i.e., 90th percentile or above) and beyond the RME exposure.

Second, there are many institutional and legal obstacles to abandoning roads, much less constructing homes on them. All public roadways and associated rights of way are owned and operated by the government and by law are dedicated to public use. All of these public roadways are subject to governmental jurisdiction with zoning and land use requirements that support continued roadway use. For example, to abandon a road in Florida, there must be notice of the intent to abandon the road, a public hearing, a duly adopted and entered resolution of abandonment, and notice of the abandonment resolution.¹⁰¹ A road cannot be abandoned if it is a public road and is used by the public (see Florida, Idaho, Louisiana, Alabama and several other state laws). Some states, such as Alabama, have a statutory preference against abandonment. Federal highways can be decommissioned, consistent with a robust public process. In the case of the Pennsylvania Turnpike, part of it was converted to a bike path.¹⁰² Similarly, the West Side highway in New York City was converted into an urban park, not housing. In any event, roads built with PG will be constructed and maintained consistent with state and federal laws. Any effort to abandon and repurpose these roads, including for development, also must be consistent with federal and state statutes and local ordinances.

Similarly, some county roads are abandoned to become state roads and some state roads are abandoned to become federal roads. Transfer of a state road to the federal highway system or vice versa is not relevant since the road remains a road.

Maintaining public roadways and associated rights of way into the future is consistent with current trends in community plans to maintain and expand roadway infrastructure and utility services (buried within right of ways) and to provide access (e.g., ingress/egress to surrounding parcels). Converting a roadway to a residential property must be done consistent with state laws and would complicate or eliminate access to surrounding parcels in addition to the redeveloped residential property¹⁰³ and is not a realistic assumption. Furthermore “[v]acating a road that

¹⁰⁰ Abandonment of unpaved roads is not relevant since we are not seeking to approve of the use of PG on unpaved roads. This factor and the other factors in the text are summarized from the Petition’s Risk Assessment (Appendix 2), Responses to Second Set of USEPA Questions – Reclaimer (Appendix 4b), and the legal research on the legal obstacles on abandonment of roads provided in the Revised Petition.

¹⁰¹ Fla. Stat. § 336.10. See 23 C.F.R. § 620B.

¹⁰² *Abandoned Stretch of Turnpike in PA*, ConstructionEquipmentGuide.com, Jan. 11, 2006, available at <https://www.constructionequipmentguide.com/redirect/6495?story=6495>.

¹⁰³ See James J. Fazzalario, Local Road Abandonment and Abutting Property Owners, OLR Research Report, 2003-R-0897 (December 24, 2003), available at <https://www.cga.ct.gov/2003/olrdata/tra/rpt/2003-R-0897.htm>.

eliminates or substantially diminishes access for abutting property owners may likely amount to a taking,”¹⁰⁴ which is another disincentive to abandonment.

Third, economics dictates that if an abandoned road is transferred to a housing association, the land will remain as a road maintained by the housing association. More generally, since storm drains and often utility lines are placed along rights of way, the abandoned road is more likely to be used as a private road, not housing. While it is not impossible for a house to be built on an abandoned roadway, it is certain to be extremely rare.

Fourth, the sustainability of roads and the use of road construction materials are key aspects of guidance and plans for roads under the jurisdictions of the Federal Highway Administration and state Departments of Transportation. The in-place abandonment of municipal infrastructure and allowance for construction of residences on top of these abandoned roads runs counter to sustainable infrastructure projects involving road construction. In any case, the construction activities required for road maintenance result in less exposure than during the original road construction (i.e., the construction activities on scale).

Thus, road abandonment, and the construction of a home on the abandoned road is not an RME exposure and, therefore, is not an ultimate disposition scenario. The fact that this extreme exposure scenario corresponds to a risk below the EPA risk management level confirms that the lesser exposure in the ultimate disposition scenario need not include a numerical risk assessment.

Finally, normally, the removal of unused PG during the road construction project is not an appropriate ultimate disposition because from an economic perspective, it is unreasonable to purchase more PG than will be used. Appropriate planning will ensure that all PG is mixed with soil (in a one to one ratio) and used in the road. In the rare case where there is unused PG, it can be used in another ongoing road construction project or returned to the PG source to be stored on a PG stack. Thus, a Reclaimer Exposure Scenario should not be utilized to determine whether to approve the use of PG for road construction.¹⁰⁵

But, since EPA requested that the risk analysis include the extreme hypothetical reclaimer scenario, it is summarized below (see Petition’s Risk Assessment and Appendix 4b: Responses

Florida Office of the Attorney General, Counties, roads and streets, dedication, vacation, Advisory Legal Opinion – AGO 78-118 (Sep. 27, 1978), *available at* <http://www.myfloridalegal.com/ago.nsf/Opinions/1F43FA7B5F1C0AF18525659300627D32>. Association of County Commissions of Alabama, Acceptance, Annexation and Vacation of County Roads (May 11, 2016), *available at* https://www.alabamacounties.org/sdm_downloads/creation-acceptance-annexation-and-vacation-of-county-roads/.

¹⁰⁴ Thomas Ruppert, Erin Deady, Jason M. Evans, & Crystal Goodson, Legal Issues When Managing Public Roads Affected by Sea Level Rise: Florida, 5 (Spring 2019), *available at* https://www.researchgate.net/publication/332528839_Legal_Issues_When_Managing_Public_Roads_Affected_by_Sea_Level_Rise_Florida.

¹⁰⁵ As a practical matter, if a risk assessment uses extreme enough assumptions, the calculated risk will exceed any risk management safe level. Thus, realistic but high-end RME are used.

to Second Set of USEPA Questions – Reclaimer, which responds to the technical issues relating to the extreme Reclaimer scenario). As part of the hypothetical reclaimer scenario, the exposure assumptions still need to be RME assumptions. The duration of exposure is 26 years (because that is EPA’s RME residential exposure (i.e., the 90th percentile of exposure)).¹⁰⁶ Normal house construction practices were utilized, such as use of non-PG fill to grade the land (which mixes the PG with non-PG soil), the use of vapor barriers and a slab beneath the house, and the like (as described in Appendix 4a: Response to EPA Comments). The annual total radiation dose is 3 mrem, which converts to 78 mrem over 26 years (the total use dose). The resident reclaimer scenario requested by EPA is an extreme exposure duration. Nonetheless, this risk (which is higher than an RME risk) corresponds to about a 0.4 in 10,000 risk, still below the PG use risk management level of 3 in 10,000.

Even this extreme hypothetical scenario does not result in exposures and risks that exceed the EPA risk management level of 3 in 10,000. It must be emphasized that the use of the reclaimer scenario does not mean it is a foreseeable ultimate disposition. In any event, the fact that this extreme exposure scenario presents a risk below 3 in 10,000 demonstrates that any conceivable RME scenario related to ultimate disposition will meet the EPA’s risk management level.

E. Groundwater Pathway Screening Analysis

EPA’s PG Petition guidance suggests that the Petition should address other potential pathways of exposure, such as the ground water pathway, if they are relevant.¹⁰⁷ The Petition used a screening analysis to address these pathways and, where appropriate, referenced EPA’s prior evaluations. A conservative screening level analysis generally is used to determine at an early stage that no further analysis is warranted.

1. Radionuclides in Groundwater

EPA performed extensive modeling of the likely migration of radionuclides in a 1992 assessment of the risk from PG used in agriculture and road construction. Neither concluded that the groundwater pathway supported restrictions on the use of PG.¹⁰⁸ EPA’s risk assessment determined in 1992 that “no radionuclides are calculated to reach the onsite well via the groundwater pathway” nor are any “radionuclide calculated to reach the off-site river or well via groundwater.”¹⁰⁹ (see SENES 1997¹¹⁰ which also examined the potential for impacts to

¹⁰⁶ 90th percentile exposure means that 90% of the exposed population has that level of exposure or less and only 10% of the population has higher exposure. EPA published its Superfund Land Use Directive in 1995 (Land Use in the CERCLA Remedy Selection Process, *supra* note 52) and reaffirmed the policy in 2001 (EPA, Reuse Assessments: A Tool To Implement The Superfund Land Use Directive, OSWER 9355.7 - 06P (June 4, 2001), available at <https://nepis.epa.gov>). EPA’s 1995 Land Use Directive acknowledges that “EPA has been criticized for too often assuming that future use will be residential” and identifies several evaluation factors to identify reasonably anticipated future land use, such as current land use, zoning laws and maps, community master planning, population growth patterns and projections, accessibility to existing infrastructure, site location, federal/state land use designation, and others.

¹⁰⁷ EPA PG Workbook, *supra* note 43, at 10.

¹⁰⁸ EPA 1992 BID, *supra* note 15, at Chp 4. See discussion in Appendix 2.

¹⁰⁹ EPA 1992 BID, *supra* note 15, at 4-31, 4-34, Scenario 8, Tables 4-5, 4-18, n. C, Scenario 11, among other sources.

groundwater and surface water pathways). These studies found no realistic potential for impacts to these pathways, i.e.:

No radionuclides are calculated to reach the on-site well via the groundwater pathway for almost 10,000 years, or the off-site river or well for more than 100,000 years because of groundwater velocities and retardation factors.¹¹¹

The radionuclide risks were found to be negligible. The TFI consultants agree with these prior assessments and no additional evaluation was deemed necessary. No monitoring data reviewed indicates significant groundwater impact from radionuclides. The Response to EPA Comments on January 16, 2020 (Appendix 4a) provides a more detailed explanation of the extremely low risks from radionuclides in groundwater, which was the basis from the Petition's Risk Assessment not duplicating these conservative calculations.

2. Screening Evaluation of the Potential Impact of Non-Radionuclides in PG

The EPA PG Guidance states:

[A petitioner] “must provide information on the other toxic or hazardous constituents of the waste...to assure that the proposed use does not cause non-radiological risks to human health and the environment.”¹¹²

To the extent the phosphogypsum is land applied or will remain in place following the test, the risk assessment must examine other potential pathways of exposure, in particular with respect to ground-water and surface water. Consideration of multiple pathways, particularly pathways associated with ground water, are consistent with our review of alternative uses as found in the 1992 rulemaking on phosphogypsum.¹¹³

Despite this, EPA did not include an assessment of the impact of metals in its review of alternative uses of PG in 1989 or 1992 (see Appendix 3).

However, EPA requested that TFI perform screening analyses of the potential impact of direct contact with PG by road construction workers, and evaluate potential metals leaching on ground and surface water quality. Thus, these assessments were performed and appear in Appendix 3.

These analyses confirm that PG is “safe” for worker handling with respect to non-radionuclides as well. Road construction workers were assumed to come into direct contact with PG (incidental ingestion, inhalation, and dermal contact). The PG concentrations were then compared to health-based screening levels. The chemicals in PG were found to be either a low risk or present at background levels.

¹¹⁰ SENES Consultants Limited, Application for Exemption – For Use of PG in the Construction of Thornhill Road, Polk County Florida (Draft), Prepared for the Florida Institute of Phosphate Research (1997).

¹¹¹ EPA 1992 BID, *supra* note 15, at Chp 4, Note C, Table 4.15.

¹¹² EPA PG Workbook, *supra* note 43, at 9.

¹¹³ *Id.* at 12.

Appendix 3 contains an assessment of the potential for metals to leach from a roadbed using PG. The design of new roads affects the potential for exposures by creating a degree of isolation of the base layer from the environment. The PG in the proposed alternative use is placed above the water table and underneath the road's paved surface. Additionally, the roads are sloped to drain precipitation.¹¹⁴ This further limits water contact with the PG isolated within the base layer. Thus, for purposes of the Petition, leaching of PG to groundwater or surface water is likely not a complete exposure pathway of concern for roadbed use and therefore no more detailed risk assessment is needed based on the typical screening level approach.

The metals concentration in the road base (and, therefore, the amount that is leached) is only 50% of the concentration of metals in PG because the PG is mixed with soil, sand, or aggregate (see Appendix 3).

The literature shows limited leaching directly from PG. For example, a 2011 University of Florida study by Mostary (2011) took twelve samples and performed comprehensive leachability testing for PG sampled from one stack in Florida (see Appendix 3). In this study, there were no exceedances of EPA's primary drinking water standards in synthetic precipitation leaching procedure (SPLP) testing and no exceedances of Resource Conservation and Recovery Act (RCRA) toxicity characteristic leaching procedure (TCLP) limits (see Appendix 3). The TCLP and the SPLP tests extracted relatively similar metal concentrations (except calcium).

Another apt risk comparison for the metals in PG are the federal and Florida land application limits for biosolids¹¹⁵ (see Appendix 3). EPA limits were based on a risk assessment for 14 exposure pathways, including groundwater (Table 6 in U.S. EPA 1995 for a guide on the Part 503 Rule.).¹¹⁶ For metals in biosolids, EPA found that leaching into groundwater or runoff into surface waters were not limiting pathways (see Appendix 3).

For the purposes of an EPA NESHAP review, it is important to understand and consider the fact that groundwater protection is primarily governed by state law and is considered under federal and state highway guidance. For example, the Florida Department of Transportation's Standard Specifications For Road And Bridge Construction states roads must: (a) "[p]rovide erosion control measures where work is accomplished in conjunction with the project, to prevent erosion, pollution of water, detrimental effects to public or private property adjacent to the project right-of-way and damage to work on the project;" (b) "[d]o not drive in, operate, or place construction equipment or materials in surface waters, wetlands, groundwater, or property beyond the project limits without permitted authority for permanent or temporary impacts; and (c) [d]o not allow water that does not meet state water quality standards or does not meet the permitted criteria to exit the project limits."¹¹⁷ That is, metals impact on groundwater will and should be determined at the local level.

¹¹⁴ Appendix 3.

¹¹⁵ 40 C.F.R. Part 503. Fla. Admin. Code 62-640.

¹¹⁶ EPA, A Guide to the Biosolids Risk Assessments for the EPA Part 503 Rule, EPA/832-B-93-005 (1995), available at <https://www.epa.gov/sites/production/files/2018-11/documents/guide-biosolids-risk-assessments-part503.pdf>.

¹¹⁷ Florida Spec Book, *supra* note 23, at 131.

The fact that materials utilized to construct roads can impact the environment has been reported by the NAS,¹¹⁸ states,¹¹⁹ and other federal agencies,¹²⁰ and applies to all road construction material, not just PG. States provide comprehensive guidance on roadway design.¹²¹ Thus, regardless of the source of the road construction material, the federal, state, and local road building agencies will assess the environmental and physical characterization to determine whether there is an impact from utilizing material A versus material B and decisions on how to mitigate any impacts is within the discretion of these agencies.

Lastly, the footprint of a road on the landscape is very small compared to agricultural lands upon which biosolids and amendments with many higher allowable metal concentrations than those in PG are permitted for continuous use (see EPA 1992 BID). The smaller footprint and lower likelihood of leaching from a constructed road compared to an agricultural field indicates that the influence on groundwater from PG in the road is likely to be comparatively very small. The amount of PG in road base is expected to be negligible in comparison and thus can be used safely in road construction given the lower metals content in PG and the smaller footprint and confinement of the base layer above the water table.

In summary, the presence of other substances that are not radionuclides in PG is unlikely to present an unacceptable worker exposure or adversely impact groundwater or surface water quality. The leaching pathway is likely not a complete pathway of concern for the PG use in road construction proposed in this Petition.

F. Risks From Other Pathways

The Response to EPA Comments on January 16, 2020 (Appendix 4a) contains an explanation of the low risks from other pathways (air, ingestion of food from a garden, etc.) and the rationale for not duplicating the risk assessment on these pathways from the 1992 BID risk assessment.

¹¹⁸ The National Academies of Science, Assessing and Managing the Ecological Impacts of Paved Roads (2005), available at <https://www.nap.edu/catalog/11535/assessing-and-managing-the-ecological-impacts-of-paved-roads>.

¹¹⁹ Idaho Transportation Department, Impacts of Using Salt and Salt Brine for Roadway Deicing, RP 231 (2014), available at <https://www.ctcandassociates.com/work-samples/saltimpacts.pdf>.

¹²⁰ USDA, Reclaimed Materials and Their Application in Road Construction: A Condensed Guide for Road Managers (December 2013), available at <https://www.fs.fed.us/t-d/pubs/pdfpubs/pdf12771807/pdf12771807dpi72.pdf>.

European countries compile information on mitigation environmental impacts. Roadex Network, Environmental Issues on Low Volume Roads, available at <https://www.roadex.org/e-learning/lessons/environmental-considerations-for-low-volume-roads/preface-environmental/>.

¹²¹ Florida Department of Transportation, Manual of Uniform Minimum Standards for Design, Construction and Maintenance for Streets and Highways (Draft), Chapter 4 (2018), available at <https://www.fdot.gov/roadway/floridagreenbook/fgb.shtm> (Commonly known as the Florida Greenbook).

G. Comparison of TFI Risk Assessment and Screening Evaluation with EPA's 1992 EPA Background Information Document (BID) Risk Assessment

Appendix 2 performed a very “high level” and preliminary overview of the main differences that we could readily identify between the dose and risk results provided in EPA's 1992 BID and those previously discussed in this report. The following is a list of comparisons:

- A 1:1 dilution of PG with soils (higher PG to soil than EPA's 1:2 PG to soil in 1992. Appendix 2, 1992 BID page 4-9).
- A road thickness of 0.25 m (the same as in 1992).
- The current risk assessment considers the same receptors as EPA did in 1992 as well as two additional receptors suggested by the EPA, namely, the truck driver transporting PG to the construction site and a utility worker who works some time in a trench cutting across a road constructed with PG.
- For the road construction worker, the EPA considered workers standing on the road base and unshielded, as was also assumed for the current risk assessment.
- The current risk assessment assumes a worker moves around over the road surface and is exposed at the average of the gamma fields at the center and edge of the road. While not fully clear, the EPA in 1992 may have assumed a worker was always in the center of the road which would largely account for the difference between gamma doses estimated in 1992 and now.
- The road user is assumed in both cases to drive on a road with a PG base and a cover (in 1992 asphalt or cement) and in the present analysis, for purpose of illustration, concrete road surface was assumed. Only annual dose and risk are available from the 1992 risk assessment. The 1992 EPA risk assessment used a 0.6 shielding for the road user, but rather than determine the degree to which vehicles have changed in the amount of metal in the under carriage of cars, the current risk assessment takes no credit for shielding provided by the vehicle that would provide some level of shielding which is a conservative assumption and could reasonably be considered.
- The dose to the nearby resident is dominated by exposure to gamma radiation which decreases rapidly with increasing distance from the edge of the road. The 1992 risk assessment assumed the nearest resident would be at 100 meters (approximately 328 ft) from the edge of the road. The current assessment considers the RME exposure scenario to be a resident whose home is located a distance of 50 feet from the edge of the road (an urban resident whose home is at 20 feet from the edge of the road is also calculated to illustrate the change in exposure levels with distance).
- The 1992 BID mentions the presence of metals, but did not consider any substances other than radionuclides in the 1992 risk assessment. The current Petition includes a metals screening evaluation to justify the fact that a quantitative risk assessment is not warranted.

- The EPA BID risk assessments considered a reclaimer scenario with exposures from gamma radiation and radon, in which the surface is removed and a house is directly built upon PG, and a resident lives in the house for 70 years (see Petition's Risk Assessment and Appendix 4b for a full review of the so called reclaimer scenario).
 - At EPA's request, this Risk Assessment calculated this reclaimer scenario, even though such a scenario is an extreme hypothetical case that is not a RME exposure. Both the 1992 and present calculation assume the surface is removed, but the current assessment takes into account the necessary construction site preparation and grading, which reduces the thickness and to a lesser degree, the concentration of residual road base construction activity that would be necessary to construct a house.
 - The 1992 BID does not indicate how the risk from radon was calculated (dose from radon was not reported in the 1992 BID).
 - The 1992 BID assumed 70-years residency and the current assessment uses EPA's current RME for duration living in a residence of 26-year residency (the upper 90th percentile) (see more in depth discussion in Sections I(B), III(A)(2), and IV (D)(9), above). Even the 1992 BID risk assessment used 26 years as the duration a person might reside in the house. Thus, the 70-year residency for the reclaimer scenario in the 1992 BID appears to be inconsistent with the residency lengths used by EPA in other parts of the 1992 as well as current EPA guidance.
 - The current assessment also assumes a 6 ml poly layer which is standard as a vapor barrier in current home construction.
- Both the 1992 BID Risk Assessment (at Table 4) and the Petition's Risk Assessment calculated the risk based on an assumed concentration of radium (226) (26 pCi versus 27 pCi/g).¹²²

These comparisons demonstrate the upper bound nature of the risk assessment. Actual doses and risks are likely to be lower.

V. RISK MANAGEMENT DECISION

TFI has provided information required by EPA¹²³ necessary for completing the agency's evaluation and determination that use of PG in road construction may be deemed at least as protective of human health as disposal on a stack. Risk management factors favor approving the use of PG for road construction. The petition and supporting risk analysis demonstrates that this use can be advanced safely. Justifications for this determination include:

The Risk Management limit of 3 in 10,000 is consistent with other NESHAP risk limits.

¹²² The 1992 BID Risk Assessment include in the table the risk from a range of radium (226) concentrations.

¹²³ Information requirements at 40 C.F.R. §§ 61.206(b) (1), (2), (6), (7), (8), and (9) for EPA approval based on a risk assessment determination and conditioned upon receipt of information requirement (3), (4), (5), and (10).

- The highest Reasonably Maximum Exposure (RME) for the use of PG in road construction, 0.5 in 10,000 (0.5 in 10,000 is 5 in 100,000), is well below the NESHAP radionuclide risk management limit of 3 in 10,000.
- For ease of calculation, this Risk Assessment used a nominal average radioactivity level in PG of 27 pCi/g. By “nominal average” we mean this is the average radioactivity level we used in our initial calculation. This number is reasonable and is similar to numbers EPA previously used.
- Once the risk from the initial calculation is determined, EPA can then estimate the risk from higher and lower radioactivity levels. For example, if the average radioactivity level for a stack is (13.5 pCi/g, then the risk is one half of that calculated for 27 pCi/g).
- At EPA’s request, TFI members recently sampled PG from multiple gypstacks (Appendix 5). This report confirms that the existing data supports the use of the PG stacks in the U.S for use in road construction. In summary, the average radioactivity level for each stack was significantly lower than 27 pCi/g.
- Furthermore, the risk assessment performed for this Petition demonstrates that 27 pCi/g corresponds to a cancer risk of 0.5 in 10,000 for the highest RME use of PG in road construction (i.e., the road construction worker), therefore the risk from these stacks is less than 0.5 in 10,000. Based on the risk assessment performed for this Petition, EPA’s PG risk management safe risk level of 3 in 10,000 corresponds to a radium (226) concentration in the PG of 148 pCi/g (see Sections I(B) and III(B)(3) and Appendix 2). Thus, PG materials in TFI’s member’s stacks may be safely used as road construction material. It is extremely unlikely if not impossible for random variation in the PG radioactivity levels to exceed an average 148 pCi/g, the radioactivity level that corresponds to a 3 in 10,000 risk management level. EPA performed extensive modeling of the likely migration of radionuclides from PG used in road construction in a 1992 assessment discussed below. The EPA concluded that the radionuclide doses from the groundwater pathways are all negligible. EPA’s assessment demonstrates that the radionuclide risks were found to be zero.
- Screening evaluation of the potential impact of metals in PG shows that PG can be used safely by workers in road construction. Paving limits direct contact by the community and also limits water contact with PG isolated in the base layer.
- Care has been taken in the assessment process to manage scientific uncertainties by choosing values and approaches that are likely to overestimate rather than underestimate risks. These result in an RME value, which serves as a reasonable upper bound on the risk distribution and is a readily accepted approach for representing maximum exposures (see Appendix 2). It also provides insight into risks to the population. RMEs overestimate risks for highest exposure situations such that actual risks would be lower.
- For perspective on exposure magnitudes, radiation levels from the use of PG are compared to naturally occurring background. Each exposure scenario has incremental radiological dose that are well below naturally occurring background levels. Exposures

to the public using the road or living immediately adjacent to the road are likely to be indistinguishable from the natural variability in background.

- There are naturally occurring background radiation and metals in other non-PG construction material including coal ash, fly ash, bottom ash, and other common construction materials. These materials have been deemed safe to use in road construction and other applications. Similarly, this Petition demonstrates the same is true for PG. The use of PG for road construction is consistent with EPA policy on recycling of wastes and waste residuals. The use of PG for roadway construction provides a net economic benefit.
- Approval of the use of PG for road construction is consistent with the Administration's regulatory reform policies.

A. Overview

The regulatory decision to approve a new use for PG is a risk management decision that is assigned to the Assistant Administrator for Air and Radiation. Risk management decisions involve weighing the results of a risk assessment with “the results of other technical analyses and nonscientific factors, to reach a decision about the need for and extent of risk reduction to be sought in particular circumstances and of the means for achieving and maintaining that reduction.”¹²⁴

This Petition and its Appendices provide the facts and science required to approve this Petition. This subsection applies these facts and the science to EPA's risk management factors and explains TFI's position that approval is appropriate.

B. The Risk Management Level of 3 in 10,000 is Consistent with Other NESHAP Goals

The EPA Office of Air and Radiation policy is to make a case-by-case decision concerning the acceptability of the risk from exposure to radionuclides.¹²⁵ However, the PG risk management limit of 3 in 10,000 is consistent with other typical EPA risk management decisions.

C. The Highest RME Risk Scenario for the Use of PG in Road Construction is Below the NESHAP Radionuclide Risk Management Goal of 3 in 10,000

This Petition demonstrates that the risks of using PG material in constructing roads satisfy the risk management goal for approved alternative uses of PG. In fact, the risk of PG in road construction is well below the risk management goal of 3 in 10,000.

¹²⁴ Institute of Medicine, *Environmental Decisions in the Face of Uncertainty*, Box 2-1 (2013), available at https://www.ncbi.nlm.nih.gov/books/NBK200844/box/box_2_1/?report=objectonly (Uncertainty in Environmental Decisionmaking).

¹²⁵ 1989 Rule, *supra* note 3, at 51,564.

The risks from all exposure scenarios were calculated, but the highest RME risk is calculated for the road construction worker who is involved with paving the road with PG that is mixed with soil (i.e., a cancer risk of 0.5 in 10,000, lower than the PG alternative use risk management goal of 3 in 10,000). EPA has long concluded that 3 in 10,000 is the equivalent of the risk from the existing PG stacks, so this alternative does not present a meaningful difference in the risk from the existing stacks. The focus is on the road construction worker since the risks from all other exposure scenarios fall below 110 mrem during road construction use and are of lower risk, although the road worker's risk falls within EPA exposure limits as well.

The vast majority of road construction workers have much lower risks than those calculated in this Petition. Highway construction workers not directly working on the road are located further from the PG and the associated risks are lower.

The risk calculation for the highest RME for a worker placing road base assumes that the PG emits 27 pCi/g exposure for five years. Based on the preliminary data on radiation levels from PG stacks, the average level of radioactivity from the PG material in each sampled stack is less than the nominal 27 pCi/g used in the risk assessment, thus, the risk from these sampled stacks is even further below the EPA risk management safe limit of 3 in 10,000 risk level. The calculated risk is scalable, i.e., if the radioactivity level in a stack is 13.5 pCi/g, the risk is one half of the risk calculated for the nominal radioactivity level of 27 pCi/g (i.e., the 13.5 pCi/g stack corresponds to a 0.28 in 10,000 risk level, significantly lower than the EPA PG risk limit of 3 in 10,000). On average, the RME exposure and the dose to risk conversion for road construction workers using PG are likely to overestimate risk.

Similarly, the highest RME to a resident living near a road (the resident lives in a home located 50 feet or more from a road for 26 years) assuming the PG contains 27 pCi/g is approximately a 0.08 in 10,000 cancer risk, again, well below the PG use risk management goal of 3 in 10,000. Most residents living near roadways are located further than 50 feet from the edge of the road, and the RME exposure and dose to risk conversion are likely to overestimate risk.

The reclaimer scenario is not a RME since it is such a rare potential event, and should not be used in the risk management decision. Nonetheless, the risk assessment report calculated a risk using RME-type exposure input below the PG use risk management goal of 3 in 10,000.

D. Science Policy Assumptions and Uncertainties are Taken into Account in the Final Risk Management Decision

1. Overview

Each of the factors EPA considers in its risk management decision has sensitivities, variabilities, and uncertainties. EPA specifically considered uncertainties and other nonrisk factors in its 1989 and 1992 decisions on acceptable alternative uses of PG.¹²⁶

A recent NAS report recommended incorporating an uncertainty analysis, which was broadly defined to include sensitivities, variability, and various other uncertainties, into EPA

¹²⁶ EPA PG Workbook *supra* note 43, at 5.

decisions.¹²⁷ This NAS report recommends that an “uncertainty analysis” be “designed on a case-by-case basis.”¹²⁸ EPA considered uncertainties in previous risk calculations and decisions concerning alternative uses of PG.¹²⁹ However, combining RME with the inherent uncertainties in the dose to risk conversion factors can yield risks that are overly conservative compared to actual risks.

Science policy influences both the exposure calculation and the cancer potency and noncancer risk factors that convert the exposure to risk. The EPA decision makers and the public need to understand how policy influences the risk calculation. Put simply, regulatory risk is not the same as actual harm. Unduly conservative risk calculations do not serve the public, since they divert limited resources to issues that present less risk. Science policy based on accumulations of conservative assumptions, including extra layers based on uncertainties, can distort risk estimates and undermine the value and credibility of risk management decisions.

2. Measurement Variation and Uncertainty

Each calculated risk depends upon how sensitive the calculation is to changes in the measurements and input values used in any risk assessment. Risk is assumed to be linearly proportional to dose and the length of exposure. For example, if the concentration of radionuclide in PG increases by 10%, the dose (and, therefore, the risk) increases by 10%. Similarly, if the length of exposure increases by 20%, the total dose increases by 20%. See Section IV, above for a discussion of the variation.

3. Variation by Location

Some of the inputs to risk assessments naturally vary. For example, the average radioactivity level in PG stacks depends upon the source of the phosphate ore and other site specific factors. This risk assessment assumed average radioactivity levels of 27 pCi/g. However, the average level of radioactivity in PG stacks in the TFI 2019 sampling varied from 6.3 to 27.9 pCi/g and data from 1988 had average stack concentration of 34 pCi/g (see Sections I(B), III(B)(3), and Appendix 5). Even levels of 148 pCi/g are safe.¹³⁰ Again, dose is directly proportional to the radioactivity level.

4. Variation Due To Design Facts

The Risk Assessment was developed to examine a conceptual road design, to provide an estimate of the upper end RME risks associated with PG use in roads. This approach is appropriate because it is impractical to perform a risk assessment that uses different values for every conceivable road design. Neither the 1989 nor the 1992 BID risk assessment considered every conceivable road design.

¹²⁷ Uncertainty in Environmental Decisionmaking, *supra* note 124, at 5.

¹²⁸ *Id.*

¹²⁹ EPA PG Workbook, *supra* note 43, at 5.

¹³⁰ Based on the risk assessment, PG with radiation levels a couple of times greater than 27 pCi/g may still be utilized for road construction. In fact, an average radiation level of 148 pCi/g corresponds to EPA's risk management goal of 3 in 10,000.

The following factors utilized to minimize the impact of any uncertainties are discussed in the Response to EPA Comments on January 16, 2020 (Appendix 4a).

- The 2019 radiological testing demonstrates that no individual radium (226) concentration exceeds 35 pCi/g radium (226) concentration requested as a concentration limit and the measured stack averages are well below the 3 in 10,000 safe risk level (i.e., a radium (226) concentration of 148 pCi/g).
- The EPA 1992 BID assumed a 1:2 dilution of PG with soils for a road base concentration of 10 pCi/g. The Petition's Risk Assessment utilized less dilution (1:1 PG:soil).
- The EPA 1992 BID assumed the road base was 0.25 m thick and 30 feet (9.15m) wide and that the road base is covered with a 0.12 m (5 in) thickness of asphalt. The Petition's Risk Assessment utilized a road thickness of 0.25 m (the same as in the EPA 1992 BID).
- The EPA 1992 BID assumed PG in a concrete road incorporates 15% PG by weight and 0.12 m thick (5 in) and 24 feet wide (7.32 m). The Petition's Risk Assessment reviewed road base design criteria and concluded 15% was a high-end criterion.
- The EPA 1992 BID used exposure to the critical population group member (nearby resident 100 m (i.e., 328 ft) from the edge of the road). The Petition's Risk Assessment calculated the radiation levels at 50 feet from the edge of the road.
- The current risk assessment assumes a worker moves around over the road surface and is exposed at the average of the gamma fields at the center and edge of the road, which is more reasonable than assuming a worker never moves for 5 years. The stationary worker is not realistic or reasonable, therefore it is not an RME.
- The 1992 EPA risk assessment used a 0.6 shielding for the road user, but rather than determine the degree to which vehicles have changed the amount of metal in the under carriage of cars, the current risk assessment takes no credit for shielding provided by the vehicle which would provide some level of shielding which is a conservative assumption and could reasonably be considered.
- The current risk assessment considered two receptors beyond those considered in the 1992 BID (truck driver and utility worker).

5. The Influence of Exposure Policies

It is well settled that exposure is not sufficient to support regulation unless there is a significant risk.¹³¹ Because empirical data are often not available, a 2013 National Academies of Science

¹³¹ "When the administrative record reveals only scant or minimal risk of material health impairment, responsible administration calls for avoidance of extravagant, comprehensive regulation. Perfect safety is a chimera; regulation must not strangle human activity in the search for the impossible. *Indus. Union Dep't. v. API*, 448 U.S. 607, 642 (1980). See *Natural Resources Defense Council v. EPA*, 824 F.2d at 1164-65.

(NAS) report noted that EPA's risk assessment policies and practices rely heavily on default options or generic approaches.¹³² These approaches can introduce high levels of uncertainty into risk assessments.

As noted above, the "intent of the RME is to estimate a conservative exposure case (i.e., well above the average case) that is still within the range of possible exposures."¹³³ A NAS Committee reviewing EPA's regulation of technologically enhanced naturally occurring radioactive material (TENORM) recommended that EPA "should use exposure and dose risk assessments that are 'reasonably realistic'" in developing standards for exposure to the various types of low level naturally occurring radiation.¹³⁴ The Committee defined "reasonably realistic" as "not....intended to greatly overestimate or underestimate actual effects for the exposure situation of concern" and EPA agreed with the Committee's recommendations.¹³⁵ Thus, by definition, RME exposures should be intentionally set at levels that are at the high end, but not an extreme worst case.

The use of defaults has been criticized by independent commentators for: (a) "lack of an adequate scientific basis;" (b) the fact that default "can mask the uncertainty;" (c) observations that defaults can be "overly conservative;" (d) the fact that cumulative impact of uncertainties is not well defined; and (e) concerns "whether there is any basis for believing that the upper-bound estimate for one substance has the same relation to the 'true' risk as it does for another substance."¹³⁶

The Response to EPA Comments on January 16, 2020 (Appendix 4a) summarizes and expands on the discussion of the reasons that the RMEs are supportable and consistent with EPA policies and the recommendations of learned advisory bodies.

6. Risk Factor Policies and Uncertainties

EPA has long utilized (and courts have long upheld) the principle that a 1 in 10,000 risk level is "safe." As a unanimous *en banc* ruling of the Court of Appeals for the District of Columbia Circuit candidly noted, the basis for claiming harm from exposure to chemicals at extremely low environmental levels is more a function of "the rules of arithmetic rather than because of any knowledge" and there was "no particular reason to think that the actual line of the incidence of

¹³² See Uncertainty in Environmental Decisions, *supra* note 124, at 58. See also National Research Council, Science and Judgment in Risk Assessment, 65 (1994), available at http://www.nap.edu/openbook.php?record_id=2125&page=65. See also General Accounting Office, Use of Precautionary Assumptions in Health Risk Assessments and Benefits Estimates, GAO-01-55, 7 (October 2000), available at <https://www.gao.gov/products/GAO-01-55>.

¹³³ EPA Risk Assessment Guidance for Superfund, *supra* note 10, at 7-1.

¹³⁴ EPA Report to Congress Re: TENORM, *supra* note 75, at 15.

¹³⁵ *Id.* citing the NAS Report at p. 245. "If high-end values are chosen for every exposure factor, then the resulting exposure estimate may no longer be consistent with the RME and may exceed the realm of possibility altogether." ITRC, Decision Making at Contaminated Sites, *supra* note 10, at 6.1.1.

¹³⁶ Uncertainty in Environmental Decisions, *supra* note 124, at 58. The RME and other factors utilized in the risk assessment are documented in the literature (see RESRAD documentation, EPA guidance or as justified in the various Appendices to this Petition).

harm is represented” by the assumption selected by EPA.¹³⁷ This acknowledgment is also apt for the risks from radionuclides.

The 2013 NAS noted that:

EPA originally selected the linear, no-threshold default as a “conservative” or “health-protective” policy choice because it assumes that there is no dose below which risks are not increased. It is likely to generate the highest, or upper-bound, risk estimate consistent with the data; the actual risk almost certainly will not exceed the upper bound and will likely fall below it.¹³⁸

Use of the International Commission on Radiological Protection (ICRP) value (proposed by the international institution whose purpose is to provide such advice) is supported by several factors:

First, ICRP is an expert advisory body that offers its recommendations to regulatory and advisory agencies, mainly by providing guidance on the fundamental principles on which appropriate radiological protection is based. The 2007 recommendation was produced “after eight years of discussions, involving scientists, regulators, and users all around the world.”¹³⁹

Second, the Petition’s use of the ICRP dose to risk conversion factor is consistent with EPA’s radiation risk assessment factors and procedures. For example, the EPA 2011 radiation guidance¹⁴⁰ provides cancer risk factors for uniform whole-body exposures of low-dose gamma radiation to the entire population, essentially the same dose to risk conversion range derived by the ICRP.

Similarly, as noted above, the organization chartered by the U.S. Congress in 1964 to, among other things, “develop ... recommendations about ... protection against radiation” (i.e., the United States National Council on Radiation Protection and Measurements (NCRP)) uses the same dose to risk conversion factor as the 2007 ICRP.¹⁴¹

Third, the international scientific and regulatory communities have widely adopted the ICRP recommendations.¹⁴²

¹³⁷ *Natural Resources Defense Council v. EPA*, 824 F.2d at 1165.

¹³⁸ Uncertainty in Environmental Decisions, *supra* note 124, at 58.

¹³⁹ 2007 ICRP Recommendations, *supra* note 88, at 3.

¹⁴⁰ EPA Radiogenic Cancer Risk Models and Projections for the U.S. Population, *supra* note 92.

¹⁴¹ Management of Exposure to Ionizing Radiation, *supra* note 93, at 42.

¹⁴² See Radiation Protection and Management of NORM Residues, *supra* note 59, at 165. The IAEA was founded to “establish or adopt ... standards of safety for protection of health and minimization of danger to life and property” and while “[r]egulating safety is a national responsibility . . . many States have decided to adopt the IAEA’s standards for use in their national regulations” (including Sweden, Denmark, the Netherlands, the UK, Japan, Canada, Belgium, Japan, and the EU). IAEA, Governmental, Legal and Regulatory Framework for Safety, 7 (2016), available at <https://www.iaea.org/publications/10883/governmental-legal-and-regulatory-framework-for-safety>.

Fourth, the International Atomic Energy Agency (IAEA) (an organization in which the U.S. is a member and helped establish) and the European Union (as well as each of its member countries) utilized a 1 millisievert (1 mSv) per year acceptable level of radiation exposure, which has been widely adopted by the international community, such as the IAEA and EU regulations. This corresponds to a 26-year total dose of 26 mSv (i.e., 2,600 mrem).

The ICRP approach is more stringent than the large, and growing, body of scientific literature that radiation risks have a threshold. Also, in 2015, a U.S. Nuclear Regulatory Commission (NRC) Advisory Committee acknowledged that:

There is a large, and growing, body of scientific literature as well as mechanistic considerations which suggest that 1) the LNT model may overstate the carcinogenic risk of radiation at diagnostic medical, occupational, and environmental doses and 2) such low doses may, in fact, exert a hormetic (i.e., a beneficial or protective) effect.¹⁴³

The United Nations Scientific Committee on the Effects of Atomic Radiation notes that below doses of 100 to 200 mGy (roughly equivalent to 10,000 to 20,000 mrem), “[e]pidemiological studies alone are unlikely to be able to identify significant elevations in risk.”¹⁴⁴

Because, as a matter of policy, neither EPA nor the Nuclear Regulatory Commission has changed its “no threshold” default assumptions, this Petition does not seek to go beyond the widely accepted ICRP value. In reality, the actual risk may be lower.

E. Comparison of Radioactivity Levels from Use of PG and Naturally Occurring Background

Each exposure scenario we assessed results in a radiation dose well below the annual natural background level (see Table 1, above). The annual background level of naturally occurring radiation is 310 mrem.¹⁴⁵ For a 26 year period, the cumulative dose is 8,060 (310 mrem times 26), thus the total dose for a nearby resident (16 mrem) given this PG use is 0.2% of the cumulative natural background dose levels ((16 divided by 8,060) (See Section I(B) and Tables 4 and 5, above)). For the RME construction worker scenario (a risk of 0.5 in 10,000), the RME worker dose is 7% of the background dose for a worker at a road construction site not using PG. (see Tables 4 and 5, above summarizing the risks from all exposure scenarios). As a result, there

See Council Directive 2013/59/Euratom, supra note 95.

See UNSCEAR, Report of the United Nations Scientific Committee on the Effects of Atomic Radiation, 8 and n. 17 (2010), available at https://www.unscear.org/docs/reports/2010/UNSCEAR_2010_Report_M.pdf (UNSCEAR Report).

¹⁴³ Nuclear Regulatory Commission, Advisory Committee on the Medical Uses of Isotopes (ACMUI), Report on the Hormesis/Linear No-Threshold Petitions, 1 (October 14, 2015), *available at* <https://www.nrc.gov/docs/ML1528/ML15287A494.pdf>.

¹⁴⁴ UNSCEAR Report, *supra* note 142, at 8.

¹⁴⁵ Appendix 2.

will be no meaningful incremental increase above the background exposure dose for any of the exposure scenarios, but particularly for the nearby resident and road user.

Background levels of radiation are often considered in governmental decisions. For example, EPA's PG Workbook compares the risk from use of PG to background levels of radiation.¹⁴⁶ When the calculated risk for receptors in a risk assessment is lower than background, it is a relevant factor in the risk management decision.

F. EPA Policy Supports Recycling of Wastes and Waste Residuals

EPA's 1989¹⁴⁷ and 1992¹⁴⁸ risk management decisions concerning alternative uses of PG took into account the Agency's overarching policy of supporting recycling. Since 1992, EPA has increased its emphasis on adopting sustainability policies.

EPA has prioritized policies to encourage recycling of a wide variety of byproducts and other materials.¹⁴⁹ Similarly, the U.S. Department of Agriculture also has issued guidance on using various reclaimed materials in road construction.¹⁵⁰ The recycling of PG decreases raw material costs for companies and government entities that use the PG material. It also decreases greenfield impacts, increases beneficial land use, and reduces long-term maintenance costs. Reuse of PG avoids potential environmental concerns with long-term storage of PG. As EPA notes in the context of coal ash use:

Beneficial use is the recycling or use of coal ash in lieu of disposal. For example, coal ash is an important ingredient in the manufacture of concrete and wallboard, and EPA supports the responsible use of coal ash in this manner. This final rule supports the responsible recycling of coal ash by distinguishing beneficial use from disposal.¹⁵¹

EPA recently concluded that:

¹⁴⁶ EPA PG Workbook, *supra* note 43, at 13 ("To put this number in perspective and to illustrate how little additional risk is permitted, the risk in the United States of developing a fatal cancer (from all causes) is about one in four").

¹⁴⁷ 1989 Rule, *supra* note 3.

¹⁴⁸ 1992 Rule, *supra* note 48, at 23,306.

¹⁴⁹ "Sustainable Materials Management (SMM) refers to the use and reuse of materials in the most productive and sustainable way across their entire life cycle. On a broader scale, SMM looks at social, environmental and economic factors to get a more holistic view of the entire system. The benefits of maximizing this connection include conserving resources, reducing waste, slowing climate change, and minimizing the environmental impacts of the materials we use." EPA, Advancing Sustainable Materials Management: 2016 Recycling Economic Information (REI) Report, EPA 530-R-17-002, 2 (2016), available at https://www.epa.gov/sites/production/files/2017-05/documents/final_2016_rei_report.pdf.

¹⁵⁰ Reclaimed Materials and Their Applications in Road Construction, *supra* note 120.

¹⁵¹ EPA, Frequent Questions about Beneficial Use of Coal Combustion residuals (CCR) (last updated March 26, 2019), available at <https://www.epa.gov/coalash/frequent-questions-about-beneficial-use-coal-ash>.

[E]nvironmental releases of COPCs from CCR fly ash concrete and FGD gypsum wallboard during use by the consumer are comparable to or lower than those from analogous non-CCR products, or are at or below relevant regulatory and health-based benchmarks for human and ecological receptors. Thus, EPA supports the continued beneficial use of coal fly ash in concrete and FGD gypsum in wallboard. Furthermore, the Agency believes that these beneficial uses provide significant environmental and economic benefits, and opportunities to advance Sustainable Materials Management (SMM).¹⁵²

The use of CCR for beneficial use in road construction is analogous to and supports the Office of Air and Radiation's approval of the use of PG in road construction. More generally, approval of the use of PG in road construction is consistent with EPA's policy of encouraging recycling.

G. Naturally Occurring Background Radioactivity and Metals are Present Widely in the Environment, Including Existing Road Construction Materials

Many consumer products contain radioactive components (smoke detectors, clocks and watches, older camera lenses, older gas lantern mantles, older televisions and computer monitors, sun lamps and tanning salons, ceramic materials such as tiles and pottery, glassware, and some EXIT signs, among other products).¹⁵³ Most consumer products contain metals. Similarly, “[r]adioactive materials (including uranium, thorium, and radium) exist naturally in soil and rock.”¹⁵⁴ Essentially all air contains radon and many types of soil and natural rock emit radiation.¹⁵⁵ In addition, virtually all road construction materials contain radioactivity and metals.

Coal ash, fly ash, bottom ash, natural gypsum, and other common construction materials¹⁵⁶ contain radioactive material (see Table below).¹⁵⁷

A 2014 evaluation of coal ash beneficial uses concluded that:

All of the existing evaluations identified concluded that radiation exposures from fly ash concrete are not a major source of concern. Several of these existing evaluations compared fly ash concrete to analogous products and found that the potential exposures

¹⁵² EPA, Coal Combustion Residual Beneficial Use Evaluation: Fly Ash Concrete and FGD Gypsum Wallboard, 5-25 (Feb. 2014), available at https://www.epa.gov/sites/production/files/2014-12/documents/ccr_bu_eval.pdf (Coal Combustion Residual Beneficial Use Evaluation).

¹⁵³ EPA, What kinds of consumer products contain radioactive materials (last updated on September 19, 2019), available at <https://www.epa.gov/radiation/what-kinds-consumer-products-contain-radioactive-materials>.

¹⁵⁴ U.S. Nuclear Regulatory Agency, Natural Background Sources (last updated October 2, 2017), available at <https://www.nrc.gov/about-nrc/radiation/around-us/sources/nat-bg-sources.html#terr>.

¹⁵⁵ *Id.*

¹⁵⁶ See Attachment B: Road construction specification examples.

¹⁵⁷ EPA Report to Congress Re: TENORM, *supra* note 75, at Appendix A.

do not represent an appreciable addition to the background radiation that the general public is subjected to on an annual basis. Naturally occurring radionuclides are present throughout the environment in food, air, water, soil, consumer products, and even the human body. All natural resources used in building construction (e.g., cement blocks, bricks, granite, soil, rocks) contain some trace level of naturally occurring radionuclides. For example, the USGS concluded that “the radioactivity of typical fly ash is not significantly different from that of more conventional concrete additives or other building materials such as granite and red brick.” The NCRP concluded that exposures from living in concrete buildings containing fly ash are “similar to calculations made for individuals living in a brick and masonry home. Consequently, it is assumed that the use of [coal ash] in building materials has not substantially increased the average dose to an individual in the population residing in a building constructed with brick or masonry materials.”¹⁵⁸

The United Kingdom Health Protection Agency “concluded that exposures to ‘...members of the public from the use of [fly ash] in building materials is negligible.’”¹⁵⁹

Thus, the appropriate risk management consideration is not whether PG has a low level of radioactivity or metals, but whether the risk is below the EPA PG risk management goal of 3 in 10,000.

¹⁵⁸ Coal Combustion Residual Beneficial Use Evaluation, *supra* note 152, at 1-7.

¹⁵⁹ *Id.*

Table 6 (copied (without footnotes) from “Appendix A – Table 1, TENORM Materials and References.”)

As a comparison to background levels, radium 226 concentrations in soils of the U.S. are shown at the top of the table.

TENORM Material	Range of Radioactivity Concentrations, Radium 226		
	Low	Average	High
Soils of the United States ¹	0.2	1.1	4.2
Uranium Mining Overburden ²	3	3.0	low hundreds
Uranium In-Situ Leach Evaporation Pond Solids ³	300	–	3,000
Phosphate Ore (Florida) ⁴	7	17.3-39.5	6.2-53.5
Phosphogypsum ⁵		11.7-24.5	36.7
Phosphate Fertilizer ⁶		5.7	21
Coal Ash ⁷ -Bottom Ash	1.6	3.5-4.6	7.7
Fly Ash	2	5.8	9.7
Petroleum (oil and gas)	0.1 pCi/l	–	9000 pCi/l
Produced Water ⁸	<0.25 pCi/g	<200 pCi/g	>100,000
Pipe/Tank Scale ⁹			pCi/g
Water Treatment Sludge ¹⁰	1.3 pCi/l	11 pCi/l	11,686 pCi/l
Treatment Plant Filters ¹¹	–	40,000 pCi/g	–
Rare Earths ¹²	5.7	–	3,244
Monazite			
Xenotime			
Bastnasite			
Titanium Ores ¹³	3.9	8.0	24.5
Rutile	–	19.7	–
Ilmenite	–	5.7	–
Wastes	–	12	–
Zircon ¹⁴	–	68	–
Wastes	87	–	1300
Aluminum ¹⁵ (Bauxite) Ores	4.4	–	7.4
Product	–	0.23	–
Wastes	–	3.9-5.6	–
Copper Wastes ¹⁶	0.7	12	82.6
Geothermal Energy Waste Scales ¹⁷	10	132	254

H. Use of PG For Roadway Construction Provides a Net Economic Benefit and is Consistent with the Administration’s Regulatory Reform Policies

A detailed report explaining the various economic benefits to be expected from approval of PG use in road construction accompanies this Petition. The report concludes that use of PG in road

construction is expected to produce cost savings ranging from \$37 million to \$160 million during the period 2020-2042.¹⁶⁰

The approval would impose no new substantive regulatory requirements and is consistent with Presidential Executive Orders that encourage: (a) reducing unnecessarily burdensome and costly regulation;¹⁶¹ (b) maximizing the use of goods, products and materials produced in the U.S.;¹⁶² and (c) encouraging innovative strategies and trade policies.¹⁶³

I. Other Benefits to Eliminating PG Stacks

Construction and maintenance of PG stacks are large engineering projects. There are environmental and actuarial risks presented by any such construction project. The approval of PG for use in road construction will reduce future potential risk by limiting the size of existing and potentially eliminating the need for new PG stacks.

J. Final Agency Action

EPA's determination that use of PG in road construction is deemed approved, consistent with certain criteria that must be met prior to use, constitutes final agency action under the Clean Air Act, 42 U.S.C. 7607 (b)(1), and the Administrative Procedures Act, 5 U.S.C. Section 704.

Under established legal precedents, an agency approval conditioned on specified requirements "mark[s] the consummation of the agency's decision-making process" and determines the "rights and obligations" of relevant parties, with "direct and appreciable legal consequences."¹⁶⁴ The approval process outlined above satisfies these legal prerequisites.

¹⁶⁰ Interestingly, the lost opportunity costs from not using fly in road construction has been estimated at \$4.5 billion. Transportation Development Foundation, The Economic Impacts of Prohibiting Coal Fly Ash Use in Transportation Infrastructure Construction, 5 (Sept. 2011), available at <https://www.artba.org/wp-content/uploads/2017/06/study2011flyash.pdf>. EPA should consider this lost opportunity cost in its risk management decision.

¹⁶¹ Presidential Executive Order on Reducing Regulation and Controlling Regulatory Costs, Executive Order 13771 (Jan. 31, 2017).

¹⁶² Presidential Executive Order on Buy American and Hire American, Executive Order 13788 (April 18, 2017).

¹⁶³ Presidential Executive Order on Establishment of Office of Trade and Manufacturing Policy, Executive Order 13797 (April 29, 2017).

¹⁶⁴ *Bennett v. Spear*, 520 U.S. 154, 178 (1997). *Whitman v. Am. Trucking, Ass'n*, 531 U.S. 457, 478 (2001).

SIGNATURE PAGE

I, Andrew (Andy) T. O'Hare, CAE, am Vice President of Public Policy for The Fertilizer Institute¹⁶⁵ (the national trade association for fertilizer companies, including the companies that own and/or operate phosphogypsum stacks). I coordinated the preparation of this Petition and am signing on behalf of all of the TFI members who own or operate PG stacks.

Andrew (Andy) T. O'Hare

Vice President of Public Policy

The Fertilizer Institute

¹⁶⁵ Since multiple companies that own and operate PG stacks are making this request, this Petition was prepared and submitted to EPA by TFI on behalf of its members. A representative of TFI is included on the signature page.

* * * * *

[FR Doc. 2021-10783 Filed 5-20-21; 8:45 am]

BILLING CODE 6560-50-P

ENVIRONMENTAL PROTECTION AGENCY

40 CFR Chapter I

[EPA-HQ-OPPT-2021-0174; FRL-10023-55]

Petition for Rulemaking Under TSCA; Reasons for Agency Response; Denial of Requested Rulemaking

AGENCY: Environmental Protection Agency (EPA).

ACTION: Petition for rulemaking; denial; reasons for Agency response.

SUMMARY: This document announces the availability of EPA's response to a portion of the petition it received February 8, 2021, from People for Protecting Peace River, Center for Biological Diversity, and 16 other organizations. While the petition requested three actions related to TSCA, EPA has determined that only one of those actions is an appropriate request: A request to issue a test rule under TSCA requiring testing of phosphogypsum and process wastewater from phosphoric acid production. EPA is treating the other portions of the petition involving TSCA as a petition under the Administrative Procedure Act (APA); those other portions request EPA to initiate the prioritization process for designating phosphogypsum and process wastewater as high-priority substances for risk evaluation, and to make a determination by rule under TSCA that the use of phosphogypsum in road construction is a significant new use. Therefore, this document does not provide EPA's response to these two TSCA-requested actions. Also, this document does not address the petitioners' requests under the Resource Conservation and Recovery Act (RCRA). After careful consideration, EPA has denied the TSCA section 21 portion of the petition for the reasons set forth in this document.

DATES: EPA's response to this TSCA section 21 petition was signed May 5, 2021.

ADDRESSES: The docket for this TSCA section 21 petition, identified by docket identification (ID) number EPA-HQ-OPPT-2021-0174, is available at <http://www.regulations.gov> or at the Office of Pollution Prevention and Toxics Docket (OPPT Docket), Environmental Protection Agency Docket Center (EPA/DC), West William Jefferson Clinton

Bldg., Rm. 3334, 1301 Constitution Ave. NW, Washington, DC. The Public Reading Room is open from 8:30 a.m. to 4:30 p.m., Monday through Friday, excluding legal holidays. The telephone number for the Public Reading Room is (202) 566-1744, and the telephone number for the OPPT Docket is (202) 566-0280.

Due to the public health concerns related to COVID-19, the EPA Docket Center (EPA/DC) and Public Reading Room are closed to visitors with limited exceptions. The EPA/DC staff continue to provide remote customer service via email, phone, and webform. For the latest status information on EPA/DC services and docket access, visit <https://www.epa.gov/dockets>.

FOR FURTHER INFORMATION CONTACT: For technical information contact: Brooke Porter, Existing Chemicals Risk Management Division (7404T), Office of Pollution Prevention and Toxics, Environmental Protection Agency, 1200 Pennsylvania Ave. NW, Washington, DC 20460-0001; telephone number: (202) 564-6388; email address: porter.brooke@epa.gov.

For general information contact: The TSCA-Hotline, ABVI-Goodwill, 422 South Clinton Ave., Rochester, NY 14620; telephone number: (202) 554-1404; email address: TSCA-Hotline@epa.gov.

SUPPLEMENTARY INFORMATION:

I. General Information

A. Does this action apply to me?

This action is directed to the public in general. This action may, however, be of interest to those persons who manufacture (including import), distribute in commerce, process, use, or dispose of phosphogypsum and process wastewater. Since other entities may also be interested, the Agency has not attempted to describe all the specific entities that may be affected by this action.

B. What is EPA's authority for taking this action?

Under TSCA section 21 (15 U.S.C. 2620), any person can petition EPA to initiate a proceeding for the issuance, amendment, or repeal of a rule under TSCA sections 4, 6, or 8, or to issue an order under TSCA sections 4, 5(e), or 5(f). A TSCA section 21 petition must set forth the facts which it is claimed establish that it is necessary to initiate the action requested. EPA is required to grant or deny the petition within 90 days of its filing. If EPA grants the petition, the Agency must promptly commence an appropriate proceeding. If EPA denies the petition, the Agency

must publish its reasons for the denial in the **Federal Register**. A petitioner may commence a civil action in a U.S. district court seeking to compel initiation of the requested proceeding within 60 days of a denial or, if EPA does not issue a decision, within 60 days of the expiration of the 90-day period.

C. What criteria apply to a decision on this TSCA section 21 petition?

1. Legal Standard Regarding TSCA Section 21 Petitions

TSCA section 21(b)(1) requires that the petition "set forth the facts which it is claimed establish that it is necessary" to initiate the proceeding requested. 15 U.S.C. 2620(b)(1). Thus, TSCA section 21 implicitly incorporates the statutory standards that apply to the requested actions. Accordingly, EPA has relied on the standards in TSCA section 21 and in the provisions under which actions have been requested in evaluating this TSCA section 21 petition.

2. Legal Standard Regarding TSCA Section 4(a)(1)(A)(i)

EPA must make several findings in order to require testing under TSCA section 4(a)(1)(A)(i) through a rule or order. EPA must find that the manufacture, distribution in commerce, processing, use, or disposal of a chemical substance or mixture, or that any combination of such activities, may present an unreasonable risk of injury to health or the environment; that information and experience are insufficient to reasonably determine or predict the effects of such activity or activities on health or the environment; and that testing of the chemical substance or mixture is necessary to develop the missing information. 15 U.S.C. 2603(a)(1)(A)(i).

3. Legal Standard Regarding TSCA Section 4(a)(1)(A)(ii)

EPA must make several findings in order to require testing under TSCA section 4(a)(1)(A)(ii) through a rule or order. EPA must find that the chemical substance or mixture is or will be produced in substantial quantities, and it enters or may reasonably be anticipated to enter the environment in substantial quantities or there is or may be significant or substantial human exposure to such substance or mixture; that information and experience are insufficient to reasonably determine or predict the effects of the manufacture, distribution in commerce, processing, use, and/or disposal of the chemical substance or mixture on health or the environment; and that testing of the

chemical substance or mixture is necessary to develop the missing information. 15 U.S.C. 2603(a)(1)(A)(ii).

4. Legal Standard Regarding TSCA Section 26

TSCA section 26(h) requires EPA, in carrying out TSCA sections 4, 5, and 6, to make science-based decisions using “scientific information, technical procedures, measures, methods, protocols, methodologies, or models, employed in a manner consistent with the best available science,” while also taking into account other considerations, including the relevance of information and any uncertainties. 15 U.S.C. 2625(h). TSCA section 26(i) requires that decisions under TSCA sections 4, 5, and 6 be “based on the weight of scientific evidence.” 15 U.S.C. 2625(i). TSCA section 26(k) requires that EPA consider information that is reasonably available in carrying out TSCA sections 4, 5, and 6. 15 U.S.C. 2625(k).

5. Legal Standard Regarding Mixtures Under TSCA Section 4(a)(1)(B) and Section 21(b)(4).

In the case of a mixture, per TSCA section 4(a)(1)(B), EPA must also find that the effects which the mixture’s manufacture, distribution in commerce, processing, use, or disposal, or any combination of such activities, may have on health or the environment may not be reasonably and more efficiently determined or predicted by testing the chemical substances which comprise the mixture. 15 U.S.C. 2603(a)(1)(B). In addition, TSCA section 21 establishes standards a court must use to decide whether to order EPA to initiate rulemaking in the event of a lawsuit filed by the petitioner after denial of a TSCA section 21 petition. 15 U.S.C. 2620(b)(4)(B). EPA believes TSCA section 21(b)(4) does not provide for judicial review of a petition to promulgate a test rule for mixtures. TSCA section 21(b)(4)(B)(i) specifies that the court’s review pertains to application of the TSCA section 4 factors to chemical substances. Moreover, TSCA section 21(b)(4)(B)(i) does not contain the additional finding that TSCA section 4 requires for issuing a test rule for mixtures (that the effect may not be reasonably and more efficiently determined or predicted by testing the chemical components). Congress left the complex issues associated with the testing of mixtures to the Administrator’s discretion.

II. Summary of the TSCA Section 21 Petition

A. What action was requested?

On February 8, 2021, the People for Protecting Peace River, Atchafalaya Basinkeeper, Bayou City Waterkeeper, Calusa Waterkeeper, Center for Biological Diversity, Cherokee Concerned Citizens, Healthy Gulf, ManaSota-88, Our Santa Fe River, RISE St. James, Sierra Club’s Florida and Delta chapters, Suncoast Waterkeeper, Suwanee Riverkeeper, Tampa Bay Waterkeeper, Waterkeeper Alliance, Waterkeepers Florida, and WWALS Watershed Coalition (the petitioners) requested EPA to take several actions under section 7004(a) of RCRA; section 21 of TSCA; and section 553 of the APA related to phosphogypsum and process wastewater from phosphoric acid production (process wastewater). With respect to TSCA, the petition asks EPA to (1) initiate the prioritization process for designating phosphogypsum and process wastewater as high-priority substances for risk evaluation under TSCA section 6(b)(1)(B)(i), (2) issue a test rule under TSCA section 4(a)(1)(A) requiring phosphogypsum and process wastewater manufacturers to develop information with respect to health and environmental effects relevant to a determination that the disposal of these chemical substances does or does not present an unreasonable risk of injury to health or the environment, and (3) make a determination by rule under TSCA section 5(a) that the use of phosphogypsum in road construction is a significant new use. This **Federal Register** document specifically addresses the petitioners’ TSCA section 21 petition, requesting EPA to issue a test rule under TSCA section 4(a)(1)(A). As described in Unit II.A.1 and II.A.2, this **Federal Register** document does not address the TSCA-requested actions which cannot be addressed under TSCA section 21 (*i.e.*, action under TSCA section 6(b)(1)(B)(i) and section 5(a)), and EPA will consider taking such action in response to those requests, as appropriate, under the APA. This **Federal Register** document also does not address the petitioners’ requests under section 7004(a) of RCRA.

1. Request for Prioritization Under TSCA Section 6 and Related Testing Under TSCA section 4(a)(2)(B)

With respect to actions under section 6 of TSCA, TSCA section 21 provides only for the submission of a petition seeking the initiation of a proceeding for the issuance, amendment, or repeal of a rule under TSCA section 6(a). Prioritization under TSCA section 6(b)

is distinct from rulemaking under TSCA section 6(a). Because TSCA section 21 does not provide an avenue for petitioners to request the initiation of the prioritization process for phosphogypsum and process wastewater, EPA is treating this portion of the request as a petition for action under the APA.

Petitioners also assert that “should EPA initiate prioritization but find that the development of new information is necessary to finalize a prioritization decision for phosphogypsum and process wastewater, EPA should exercise its authority under section 4(a)(2)(B) to obtain that information and establish priority” (Ref. 1, page 41). Because EPA is not addressing the request for prioritization as part of this petition response and has not otherwise initiated prioritization on phosphogypsum or process wastewater, the Agency is not in a position to exercise its authority under TSCA section 4(a)(2)(B) in the manner and for the reason described by petitioners.

2. Request for Significant New Use Rule Under TSCA Section 5

TSCA section 21 does not provide for the submission of a petition seeking the initiation of a rule under TSCA section 5. Significant new use rules are issued under the authority of TSCA section 5(a)(2). Since TSCA section 21 does not provide an avenue for petitioners to request the initiation of a proceeding to make a determination by rule under TSCA section 5(a), EPA is treating this portion of the request as a petition for action under the APA.

3. Request for Issuance of a Test Rule Under TSCA Section 4(a)(1)(A)

TSCA section 21 does provide for the submission of a petition seeking issuance of a test rule under TSCA section 4(a)(1)(A). Therefore, this **Federal Register** document specifically addresses the only request permissible under TSCA section 21, requesting EPA to issue a test rule under TSCA section 4(a)(1)(A).

4. Request Under RCRA Section 7004(a)

This **Federal Register** document does not address the petitioners’ requests under section 7004(a) of RCRA.

5. Request Under APA Section 553(e)

This **Federal Register** document does not address the petitioners’ requests under section 553(e) of the APA.

B. What support did the petitioners offer?

The petitioners are not clear as to the provision of TSCA section 4(a)(1)(A)

under which they are seeking a test rule. On pages 13 and 14 of the petition, for example, petitioners list the criteria to evaluate the request for testing under TSCA section 4(a)(1)(A)(i). However, in addition, the petition also includes reference to TSCA section 4(a)(1)(A)(ii). Because the petitioners were not clear whether they were seeking testing under TSCA section 4(a)(1)(A)(i) or 4(a)(1)(A)(ii), EPA considered the criteria in both sections in evaluating the petition. Additionally, because petitioners did not indicate whether the requested testing would pertain to mixtures or to individual chemical substances within a mixture, EPA considered both in evaluating the petition.

1. May Present an Unreasonable Risk of Injury to Health or the Environment or Produced in Substantial Quantities

The petitioners claim that phosphogypsum and process wastewater located across the United States may present an unreasonable risk of injury to human health and the environment under TSCA section 4(a)(1)(A)(i)(I). The petitioners claim that in EPA's 1991 regulatory determination under the Bevill Amendment to RCRA (section 3001(b)(3)(A) of RCRA), regarding the exemption of processing ores and minerals, including phosphate rock, EPA indicated that phosphogypsum and process wastewater were more appropriate to address under a TSCA regulatory program. The petitioners make a general assertion that "EPA's investigation of a TSCA regulatory program to manage phosphogypsum and process wastewater means these substances not only may, but do, pose an unreasonable risk of injury to human health and the environment" (Ref. 1, page 40). The petitioners point to the following studies and contend that worker exposure at phosphate fertilizer plants is associated with adverse health effects, however, an exposure-response relationship could not be established in these studies:

- Yiin, JH *et al.*, 2016 (Ref. 2); and
- Kim, Kwang Po *et al.*, 2006 (Ref. 3).

In addition, petitioners include information regarding the toxicity of several chemical substances they indicate are "phosphogypsum constituents" (arsenic, lead, nickel, cadmium, chromium, silver, antimony, copper, mercury, and thallium), as well as information on radionuclides (uranium, thorium, and radium) (Ref. 1, pages 19–23).

As support for the claim that phosphogypsum and process wastewater are produced in substantial

quantities under TSCA section 4(a)(1)(A)(ii)(I), petitioners provide information about the size of phosphogypsum stacks, the amount of phosphogypsum produced annually, and the volume of process wastewater that can be stored in stacks (Ref. 1). Regarding production in substantial quantities, petitioners point to an EPA web page indicating that phosphogypsum is produced in quantities of 5.2 tons for every ton of phosphoric acid produced (Ref. 4). In addition, petitioners cite to information indicating that approximately 46 million tons of phosphogypsum are created in the United States annually (Ref. 5).

2. Insufficient Information and Experience

Without providing supporting rationale, the petitioners assert that updated information is needed, including:

- Information on "population-level exposure risks" for radionuclides and radon emissions for phosphogypsum stacks; and
- Information on the number and size of the phosphogypsum stacks.

The petitioners also state that the majority of the available phosphogypsum and process wastewater research is focused on potential commercial uses, rather than toxicity and other health and environmental effects relevant to an unreasonable risk finding (Ref. 1, page 40).

3. Testing of Such Substance or Mixture With Respect to Such Effects Is Necessary To Develop Such Information

The petitioners claim that a TSCA section 4 "testing rule is necessary to fill gaps in current science and to better inform a future risk evaluation," citing the need for updated information on "population-level exposure risks" for radionuclide and radon emissions for phosphogypsum stack systems since the population around each phosphogypsum stack has likely increased (Ref. 1, page 40). The petitioners also claim it is necessary to update toxicity information using the Toxicity Characteristic Leaching Procedure (TCLP) method (Ref. 1, page 40). The petitioners provide no further information identifying specific gaps in the TCLP information already available, or why additional testing is necessary under TSCA section 4(a)(1)(A).

III. Disposition of TSCA Section 21 Portion of the Petition

A. What is EPA's response?

After careful consideration, EPA has denied the TSCA section 21 portion of the petition. A copy of the Agency's response, which consists of the letter to the petitioners and this document, is posted on the EPA petition website at <https://www.epa.gov/assessing-and-managing-chemicals-under-tsca/tscasection-21#reporting>. The response, the petition (Ref. 1), and other information is available in the docket for this TSCA section 21 petition (see ADDRESSES).

B. What was EPA's reason for this response to the request for testing under TSCA section 4?

TSCA section 21 does provide for the submission of a petition seeking the initiation of a proceeding for the issuance of a rule under TSCA section 4. The petition must "set forth the facts which it is claimed establish that it is necessary to issue" the requested rule. 15 U.S.C. 2620(b)(1). When determining whether the petition meets that burden, EPA will consider whether the manufacture, distribution in commerce, processing, use, or disposal of a chemical substance or mixture, or any combination of such activities, may present an unreasonable risk of injury to health or the environment under TSCA section 4(a)(1)(A)(i)(I), or whether the chemical substance or mixture is or will be produced in substantial quantities, and it enters or may reasonably be anticipated to enter the environment in substantial quantities or there is or may be significant or substantial human exposure to such substance or mixture under TSCA section 4(a)(1)(A)(ii)(I). In addition, EPA will consider whether "information available to the Administrator is insufficient to permit a reasoned evaluation of the health and environmental effects of the chemical substance or mixture." 15 U.S.C. 2620(b)(4)(B)(i)(I) (see also 15 U.S.C. 2603(a)(1)). Furthermore, EPA's decision to grant a petition for the promulgation of a TSCA section 4 rule requires a finding that "testing of such substance or mixture with respect to such effects is necessary to develop such information." 15 U.S.C. 2603(a)(1). In the case of a mixture, the petitioners must set forth facts to establish that the effects of the mixture would not be "reasonably and more efficiently determined or predicted by testing the chemical substances which comprise the mixture." 15 U.S.C. 2603(a)(1).

EPA evaluated the information presented or referenced in the petition

and considered that information in the context of the applicable authorities and requirements of TSCA sections 4, 21, and 26. Notwithstanding that the burden is on the petitioners to present “the facts which it is claimed establish that it is necessary” for EPA to initiate the rule or issue the order sought, EPA nonetheless also considered relevant information that was reasonably available to the Agency during the 90-day petition review period. As detailed in Unit III.B.2 and III.B.3, EPA finds that the petitioners have not met their burden as defined in TSCA sections 4(a)(1)(A) and 21(b)(1) because the petitioners have not provided the facts necessary for the Agency to determine for phosphogypsum and process wastewater that existing information and experience are insufficient and testing with respect to such effects is necessary to develop such information. These deficiencies, among other findings, are detailed in this document.

1. May Present Unreasonable Risk of Injury to Health or the Environment or Produced in Substantial Quantities

EPA is not opining on the sufficiency of the information presented for purposes of determining whether phosphogypsum or process wastewater may present unreasonable risk because the Agency finds that petitioners have not provided the facts necessary for the Agency to determine that existing information and experience are insufficient and testing with respect to such effects is necessary to develop such information, as described in more detail below. However, EPA agrees that phosphogypsum and process wastewater are or will be produced in substantial quantities under TSCA 4(a)(1)(A)(ii)(I).

2. Insufficient Information and Experience

The petition does not set forth the facts necessary to demonstrate that there is “insufficient information and experience” on which the effects of phosphogypsum and process wastewater on health or the environment can reasonably be determined or predicted. The petitioners only claim that updated toxicity information using the TCLP method is necessary and assert that information available is from an outdated “Extraction Procedure.” However, EPA has found that there are TCLP data related to phosphogypsum and process wastewater available in the public domain (Ref. 6). The petitioners failed to present facts indicating the nature and extent of existing TCLP data and articulate why this data is

insufficient. The petitioners do not provide an assessment of existing data to support a finding of insufficient information and experience. The petitioners present no evidence that they undertook efforts such as a literature search of publicly available information, an analysis and characterization of the results of such a literature search, or an inventory of information they claim is missing from the public domain.

Extensive information on the heavy metal chemical substances contained in phosphogypsum and process wastewater is readily available. For example, EPA has published Integrated Risk Information System (IRIS) assessments, which review existing information and characterize the hazards of chemicals, that are available for all of the heavy metals mentioned in the petition, as well as uranium (Ref. 7). Furthermore, the Agency for Toxic Substances and Disease Registry (ATSDR) has published Toxicological Profiles, which characterize the toxicologic and adverse health effects information for hazardous substances, for all of the metals, as well as for radon and the radionuclides referenced in the petition (Ref. 8). The petitioners make no mention of the IRIS assessments, nor have they provided the facts necessary to show that this extensive body of existing information on toxicological effects, including the ATSDR Toxicological Profiles cited in the petition, is insufficient. TSCA section 21 requires the petitioner, not EPA, to “set forth the facts which it is claimed establish that it is necessary to issue, amend, or repeal a rule under TSCA sections 4, 6, or 8, or an order under TSCA sections 4 or 5(e).” 15 U.S.C. 2620. Therefore, petitioners have failed to meet their burden.

3. Testing of Such Substance or Mixture With Respect to Such Effects Is Necessary To Develop Such Information

The petition did not include any data, information, or analysis related to the need for testing of phosphogypsum and process wastewater or for the chemical substances, including the heavy metals and radionuclides contained in phosphogypsum and process wastewater. A petition without such information is facially incomplete because it fails to provide minimum factual information for EPA to make the threshold findings needed to respond to and act on the petition as contemplated by TSCA section 21. Even if the petitioners had successfully demonstrated the insufficiency of existing information, they still failed to demonstrate that testing of

phosphogypsum and process wastewater is needed to develop the necessary information that they claim does not exist. Importantly, the petitioners provided no information regarding how testing by manufacturers of phosphogypsum and process wastewater would provide the sort of health and environmental effects data that petitioners believe is necessary. The petitioners could have presented information about the types of tests that could be conducted, including some analysis of the methods that could be used to identify the data or information submitted or used, hazard thresholds recommended, and exposure estimates. Beyond an assertion that TCLP data is not available, the petitioners did not include any information on what type of testing they claim is needed.

4. Testing as a Mixture

Petitioners do not indicate whether the requested testing would pertain to mixtures or to individual chemical substances within a mixture. With regard to testing phosphogypsum and process wastewater as a mixture, petitioners have not set forth facts sufficient to support the required finding for mixtures under TSCA section 4(a)(1): That the effects of phosphogypsum and process wastewater would not be “reasonably and more efficiently determined or predicted by testing the chemical substances which comprise the mixture.” 15 U.S.C. 2603(a)(1). EPA has broad discretion to make this finding, and although petitioners did not specify whether their request was for testing of phosphogypsum and process wastewater as a mixture, EPA does not, at this time, believe this finding is warranted.

5. Environmental Justice Considerations

Petitioners express environmental justice concerns and include examples of a phosphogypsum and process wastewater facility near a historic Black neighborhood, and another facility in a region of Louisiana which they state has environmental justice concerns related to impacts from a variety of industrial activities (Ref. 1, pages 36–38).

As a general matter, EPA shares the petitioners’ concerns regarding the potential for disproportionate impacts in communities with environmental justice concerns. However, petitioners must set forth the facts which it is claimed establish that it is necessary to issue a rule or order requiring testing under TSCA section 4(a)(1)(A). As petitioners have not set forth facts sufficient for EPA to make these findings, EPA is not able to issue a test

rule under TSCA section 4 in response to this TSCA section 21 petition.

6. What were EPA's conclusions?

EPA denied the request to initiate a proceeding for the issuance of a rule under TSCA section 4 because the TSCA section 21 petition does not set forth the facts establishing that it is necessary for the Agency to issue such a rule. In particular, the petition does not demonstrate that existing information and experience on the effects of phosphogypsum and process wastewater are insufficient or that testing of phosphogypsum and process wastewater with respect to such effects is necessary to develop such information. Therefore, the petitioners have not demonstrated that the rule they requested is necessary.

IV. References

The following is a listing of the documents that are specifically referenced in this document. The docket includes these documents and other information considered by EPA, including documents that are referenced within the documents that are included in the docket, even if the referenced document is not physically located in the docket. For assistance in locating these other documents, please consult the technical person listed under **FOR FURTHER INFORMATION CONTACT**.

1. Curran, Rachael, People for Protecting Peace River, and Lopez, Jaclyn, Center for Biological Diversity to the Administrator of the Environmental Protection Agency. Re: Petition for Rulemaking Pursuant to Section 7004(a) of the Resource Conservation and Recovery Act; Section 21 of the Toxic Substances Control Act; and Section 553 of the Administrative Procedure Act Concerning the Regulation of Phosphogypsum and Process Wastewater from Phosphoric Acid Production. Received February 8, 2021.
2. Yiin, JH *et al.* A study update of mortality in workers at a phosphate fertilizer production facility. *American Journal of Industrial Medicine* 59(1):12–22. January 2016. <https://doi.org/10.1002/ajim.22542>.
3. Kim, Kwang Po *et al.* Characterization of Radioactive Aerosols in Florida Phosphate Processing Facilities. *Aerosol Science and Technology* 40(6):410–421. February 2006. <https://doi.org/10.1080/02786820600643313>.
4. EPA. TENORM: Fertilizer and Fertilizer Production Wastes. April 7, 2021. <https://www.epa.gov/radiation/tenorm-fertilizer-and-fertilizer-production-wastes>.
5. The Fertilizer Institute. Revised Request for Approval of Additional Uses of Phosphogypsum Pursuant to 40 CFR 61.206. April 2020. <https://www.epa.gov/>

- [sites/production/files/2020-10/documents/4-7-2020_pg_petition.pdf](https://www.epa.gov/sites/production/files/2020-10/documents/4-7-2020_pg_petition.pdf).
6. EPA. Mosaic Fertilizer, LLC Settlement. September 16, 2020. <https://www.epa.gov/enforcement/mosaic-fertilizer-llc-settlement>.
 7. EPA. Integrated Risk Information System. March 26, 2021. <https://www.epa.gov/iris>.
 8. Agency for Toxic Substances and Disease Registry. March 16, 2021. <https://www.atsdr.cdc.gov/toxprofiledocs/index.html>.

Authority: 15 U.S.C. 2601 *et seq.*

Michal Freedhoff,
Principal Deputy Assistant Administrator,
Office of Chemical Safety and Pollution
Prevention.

[FR Doc. 2021–09998 Filed 5–20–21; 8:45 am]

BILLING CODE 6560–50–P

NATIONAL TRANSPORTATION SAFETY BOARD

49 CFR Part 830

[Docket No.: NTSB–2021–0004]

RIN 3147–AA20

Amendment to the Definition of Unmanned Aircraft Accident

AGENCY: National Transportation Safety Board (NTSB).

ACTION: Notice of proposed rulemaking (NPRM).

SUMMARY: The National Transportation Safety Board (NTSB) proposes amending the definition of “Unmanned aircraft accident” by removing the weight-based requirement and replacing it with an airworthiness certificate or airworthiness approval requirement. The weight threshold is no longer an appropriate criterion because unmanned aircraft systems (UAS) under 300 lbs. are operating in high-risk environments, such as beyond line-of-sight and over populated areas. The proposed definition will allow the NTSB to be notified of and quickly respond to UAS events with safety significance.

DATES: Send comments on or before July 20, 2021.

ADDRESSES: You may send comments, identified by Docket Number (No.) NTSB–2021–0004, by any of the following methods:

- *Federal e-Rulemaking Portal:* <http://www.regulations.gov>.
 - *Email:* rulemaking@ntsb.gov.
 - *Fax:* 202–314–6090.
 - *Mail/Hand Delivery/Courier:* NTSB, Office of General Counsel, 490 L’Enfant Plaza East SW, Washington, DC 20594.
- Instructions:** All submissions in response to this NPRM must include

Docket No. NTSB–2021–0004. All comments received will be posted without change to <http://www.regulations.gov>, including any personal information provided.

Docket: For access to the docket, go to <http://www.regulations.gov> and search Docket No. NTSB–2021–0004.

FOR FURTHER INFORMATION CONTACT:
 Kathleen Silbaugh, General Counsel,
 (202) 314–6080, rulemaking@ntsb.gov.

SUPPLEMENTARY INFORMATION:

I. Background

The NTSB prescribes regulations governing the notification and reporting of accidents involving civil aircraft. As an independent federal agency charged with investigating and establishing the facts, circumstances, and probable cause of every civil aviation accident in the United States, the NTSB has an interest in redefining a UAS accident in light of recent developments in the industry.

For NTSB purposes, “unmanned aircraft accident” means an occurrence associated with the operation of an unmanned aircraft that takes place between the time that the system is activated with the purpose of flight and the time that the system is deactivated at the conclusion of its mission, and in which any person suffers death or serious injury, or in which the aircraft has a maximum gross takeoff weight of 300 lbs. or greater and receives substantial damage.

At the time this definition was contemplated, the weight-based requirement was necessary because defining an accident solely on “substantial damage” would have required investigations of numerous small UAS crashes with no significant safety issues. *See* Final Rule, 75 FR 51953, 51954 (Aug. 24, 2010). Consequently, there is no legal requirement to report or for the NTSB to investigate events involving substantial damage to UAS weighing less than 300 lbs. because these are not recognized “unmanned aircraft accidents” under the NTSB’s regulations. While this definition ensured that the NTSB expended resources on UAS events involving the most significant risk to public safety, the advent of higher capability UAS applications—such as commercial drone delivery flights operating in a higher risk environment (e.g., populated areas, beyond line-of-sight operations, etc.)—has prompted the agency to propose an updated definition of “unmanned aircraft accident.” Moreover, in the August 24, 2010, Final Rule, the NTSB anticipated future updates of the definition given the evolving nature of UAS technology and operations. *Id.*

IN THE UNITED STATES DISTRICT COURT
FOR THE MIDDLE DISTRICT OF FLORIDA

UNITED STATES OF AMERICA,)	
FLORIDA DEPARTMENT OF)	
ENVIRONMENTAL PROTECTION)	No.
Plaintiffs,)	
v)	
)	CIVIL COMPLAINT
MOSAIC FERTILIZER, LLC,)	
)	
Defendant.)	

The United States of America, by authority of the Attorney General of the United States and through the undersigned attorneys acting at the request of the Administrator of the United States Environmental Protection Agency (EPA), together with the Florida Department of Environmental Protection (FDEP), by and through its Office of General Counsel, file this Complaint and allege as follows:

I. NATURE OF THIS ACTION

1. This is a civil action brought pursuant to Section 3008(a) and (g) of the Resource Conservation and Recovery Act (RCRA), 42 United States Code (U.S.C.) § 6928(a) and (g), and pursuant to the Florida Resource Recovery and Management Act, specifically § 403.727, Florida Statutes (F.S.), against Mosaic Fertilizer, LLC, (Mosaic or Defendant). The United States and FDEP (Plaintiffs) seek injunctive relief and the assessment of civil penalties for environmental violations at Mosaic's Bartow, Riverview, Green Bay, New Wales, and South Pierce Facilities, as well as the assessment of civil penalties for environmental violations at Mosaic's Mulberry facility, all of which are located in Florida (respectively the Bartow Facility,

the Riverview Facility, the Green Bay Facility, the New Wales Facility, the South Pierce Facility, and the Mulberry Facility, collectively the Facilities).

2. As set forth below, and as set forth in Plaintiffs' RCRA inspection reports or RCRA notices of violation, Defendant has violated the statutory and regulatory requirements applicable to the management and disposal of solid and/or hazardous waste, found at §§ 403.721 and 403.722, F.S., the Florida Resource Recovery and Management Act, and the regulations promulgated thereunder, including Chapter 62-730 Florida Administrative Code (F.A.C.) (the corresponding federal citations are Sections 3004 and 3005 of RCRA, 42 U.S.C. §§ 6924, 6925, and the regulations promulgated thereunder, including 40 C.F.R. Parts 261, 262, 264, 265, 268 and 270).

II. PARTIES

3. Plaintiffs are the United States of America and FDEP.

4. Defendant Mosaic is incorporated in the State of Delaware, and is licensed to do business in Florida.

5. On October 22, 2004, concurrent with the merger of the Cargill fertilizer business with IMC Global, the name of Cargill Fertilizer, LLC was changed to Mosaic Fertilizer, LLC. (Mosaic). Mosaic is, and at all times relevant to this lawsuit has been, the owner and operator of the Facilities.

III. JURISDICTION AND VENUE

6. This Court has jurisdiction over the parties and the subject matter of this action pursuant to RCRA Section 3008(a), 42 U.S.C. § 6928(a), and 28 U.S.C. §§ 1331 (federal question jurisdiction), 1332 (diversity), 1345 (jurisdiction when the United States is a plaintiff), 1355 (jurisdiction over penalties arising under federal claims), and 1367 (supplemental jurisdiction).

7. Venue is proper in this judicial district pursuant to 28 U.S.C. §§ 1391(b) and 1395(a), and RCRA Section 3008(a)(1), 42 U.S.C. § 6928(a)(1), because Defendant is located and is doing business in this District and the violations occurred in this District.

8. Authority to bring this civil action is vested in the Attorney General of the United States and the Administrator of EPA pursuant to Section 3008(a) of RCRA, 42 U.S.C. § 6928(a), and 28 U.S.C. §§ 516 and 519.

9. Authority to bring this civil action is vested in FDEP pursuant to §§ 20.255, 403.121, 403.131, 403.727, and 403.805, F.S.

10. The United States has provided notice to the State of Florida prior to the commencement of this action in accordance with RCRA Section 3008(a)(2), 42 U.S.C. § 6928(a)(2).

IV. STATUTORY AND REGULATORY BACKGROUND

11. Federal regulation of hazardous waste is primarily based on RCRA, enacted on October 21, 1976 to amend the Solid Waste Disposal Act, and on the Hazardous and Solid Waste Amendments (HSWA) enacted by Congress in 1984 to further amend the Solid Waste Disposal Act. RCRA establishes a “cradle-to-grave” program to be administered by the Administrator of EPA and authorized states for regulating the generation, transportation, treatment, storage, and disposal of hazardous waste. See 42 U.S.C. § 6901 *et seq.*

12. RCRA’s Subchapter III (RCRA §§ 3001-3023, 42 U.S.C. §§ 6921-6940, known as “Subtitle C”) required EPA to promulgate regulations establishing performance standards applicable to facilities that generate, transport, treat, store, or dispose of hazardous wastes. Together, RCRA Subtitle C and its implementing regulations, set forth at 40 C.F.R. Parts 260 – 279, comprise EPA’s RCRA hazardous waste program.

13. RCRA Section 3006, 42 U.S.C. § 6926, allows the Administrator to authorize a state to administer its own hazardous waste program in lieu of the federal program when the Administrator deems the state program to be equivalent to and consistent with the federal program.

14. Pursuant to Section 3006(b) of RCRA, 42 U.S.C. § 6926(b), the State of Florida was granted final authorization by EPA to administer and enforce a hazardous waste program on February 12, 1985; on November 17, 2000, the State of Florida was authorized to implement a corrective action program under the HSWA. Part IV, Resource Recovery and Management, of Chapter 403, F.S., provides statutory authority for the state regulatory program as implemented in Chapter 62-730, F.A.C. "Hazardous Waste," including the regulations that are part of the authorized state program. FDEP is the State agency designated to implement the authorized RCRA program in Florida.

15. Although EPA has granted the State authority to enforce its own hazardous waste program, EPA retains jurisdiction and authority to initiate an independent enforcement action, pursuant to Section 3008(a)(2) of RCRA, 42 U.S.C. § 6928(a)(2).

16. As the authorized provisions of Florida's hazardous waste program operate in lieu of the federal RCRA program, the citations for the violations of those authorized provisions alleged herein will be to the authorized Florida program; however, for ease of reference, the federal citations will follow in parentheses.

17. F.A.C. Rule 62-730.020 (40 C.F.R. § 261.2) defines a solid waste as any discarded material that is not otherwise excluded under F.A.C. Rule 62-730.030 (40 C.F.R. § 261.4(a)) or that is not excluded by variance. A discarded material is any material which is abandoned, recycled, inherently waste-like, or a military munition. Materials are solid waste, as

defined in F.A.C. Rule 62-730.020 (40 C.F.R. § 261.2), if they are abandoned by being disposed of, burned or incinerated, or accumulated, stored, or treated (but not recycled) before, or in lieu of, being abandoned by being disposed of, burned, or incinerated.

18. A solid waste is a hazardous waste if it is not excluded from regulation as a hazardous waste under F.A.C. Rule 62-730.030 (40 C.F.R. § 261.4(b)) and it exhibits any of the characteristics of hazardous waste identified in F.A.C. Rule 62-730.030 (40 C.F.R. Part 261, Subpart C) or it is listed in F.A.C. Rule 62-730.030 (40 C.F.R. Part 261, Subpart D).

19. Characteristic hazardous wastes are assigned “D” codes in F.A.C. Rule 62-730.030 (40 C.F.R. Part 261, Subpart C) depending on the specific hazardous characteristic that the waste exhibits. A hazardous waste with a pH of less than or equal to 2.0 or greater than or equal to 12.5 exhibits the characteristic of corrosivity and is assigned the D002 hazardous waste code pursuant to F.A.C. Rule 62-730.030 (40 C.F.R. § 261.22).

20. Certain solid wastes from the extraction, beneficiation, and processing of ores and minerals to generate a saleable product are excluded from the definition of hazardous wastes pursuant to F.A.C. Rule 62-730.030 (40 C.F.R. § 261.4(b)(7))(the Bevill Exclusion).

21. “Materials that are saleable, either as raw materials to other types of industrial processes (e.g. chemical manufacturing such as MAP/DAP) or as finished products, are considered final products.” [54 Fed. Reg. 36,620, September 1, 1989].

22. While the first saleable product for the phosphoric acid industry is typically 52% to 54% phosphoric acid with less than 1% solids, which is known as Merchant Grade Acid (MGA), EPA made it clear during the 1990 rule-making that the Bevill Exclusion can end before MGA is produced if intermediate mineral products are used as feedstocks to other industrial processes,

such as monoammonium phosphate (MAP), diammonium phosphate (DAP), Superphosphoric Acid (SPA), Purified Acid, or other chemical manufacturing processes. [*Id.*]

23. For a mineral processing waste to be excluded under the Bevill Exclusion, it must fall into one of the twenty specific categories of excluded wastes listed at F.A.C. Rule 62-730.030 (40 C.F.R. § 261.4(b)(7)(ii)).

24. The Bevill Exclusion applies to only two wastes generated from phosphoric acid mineral processing operations: “(p)hosphogypsum from phosphoric acid production,” (F.A.C. Rule 62-730.030 (40 C.F.R. § 261.4(b)(7)(ii)(D))), and “process wastewater from phosphoric acid production” (F.A.C. Rule 62-730.030 (40 C.F.R. § 261.4(b)(7)(ii)(P))).

25. Chemical manufacturing wastes, cleaning wastes, air pollution control device (“scrubber”) wastes, and wastes generated after the first saleable product are not “process wastewater from phosphoric acid production” and do not qualify for the Bevill Exclusion.

26. When Bevill-excluded phosphogypsum and process wastewater from phosphoric acid production are mixed with hazardous non-excluded wastes, if the resulting mixture continues to exhibit a hazardous characteristic of the non-excluded waste, then the entire mixture is a hazardous waste pursuant to the Bevill Mixture Rule, promulgated at F.A.C. Rule 62-730.030 (40 C.F.R. § 261.3(a)(2)(i)).

27. In addition, if a Bevill-excluded waste is mixed with a listed hazardous waste, the resultant mixture is a listed hazardous waste pursuant to F.A.C. Rule 62-730.030 (40 C.F.R. § 261.3(a)(2)(iv)).

28. F.A.C. Rule 62-730.180 (40 C.F.R. Parts 264/265) applies to owners and operators of facilities that treat, store or dispose of hazardous waste.

29. FDEP's (and EPA's) statutes and regulations (as relevant to this Complaint) require that generators of solid waste and hazardous waste must, among other things:

- a. Determine whether generated solid wastes are hazardous, F.A.C. Rule 62-730.030 (40 C.F.R. § 262.11);
- b. Keep records of hazardous waste determinations, F.A.C. Rule 62-730.160 (40 C.F.R. § 262.40(c));
- c. Treat, store, and dispose of hazardous waste in compliance with a permit and other applicable regulatory requirements, or, if they qualify for interim status, with interim status requirements, including obtaining financial assurance where applicable, § 403.722, F.S. (Section 3005(a) of RCRA, 42 U.S.C. § 6925(a));
- d. Meet certain requirements for waste treatment prior to placement or disposal of hazardous waste on the land, F.A.C. Rule 62-730.183 (40 C.F.R. Part 268).

30. Pursuant to Sections 3008(a) and (g) and 3006(g) of RCRA, 42 U.S.C. §§ 6928(a) and (g) and 6926(g), the United States may enforce the federally-approved Florida hazardous waste program, as well as the federal regulations that remain effective in Florida, by filing a civil action in United States District Court seeking civil penalties not to exceed \$25,000 per day per violation (prior to January 30, 1997), and injunctive relief.

31. Pursuant to the Federal Civil Penalties Inflation Adjustment Act of 1990, 28 U.S.C. § 2471, as amended by 31 U.S.C. § 3701, and as provided in 40 C.F.R. Part 19, the amount specified in the foregoing Paragraph increases to \$27,500 per day for each violation occurring after January 30, 1997, further increases to \$32,500 per day for each violation occurring after March 15, 2004 and further increases to \$37,500 per day for each violation occurring after

January 12, 2009. Each day of such violation constitutes a separate violation pursuant to Section 3008(g) of RCRA, 42 U.S.C. § 6928(g).

32. Pursuant to § 403.727, F.S., FDEP is authorized to enforce its hazardous waste regulations and to seek judicial imposition of penalties of up to \$50,000 per day for each violation.

V. GENERAL RCRA ALLEGATIONS

33. Defendant Mosaic is a “person” within the meaning of Section 1004(15) of RCRA, 42 U.S.C. § 6903(15), which includes corporations; and within the meaning of F.A.C. Rule 62-730.020(1) (40 C.F.R. § 260.10).

34. Defendant Mosaic is an “owner” and “operator” of the Facilities within the meaning of F.A.C. Rule 62-730.020(1) (40 C.F.R. § 260.10).

35. The phosphogypsum generated at the Mosaic Facilities meets the definition of “(p)hosphogypsum from phosphoric acid production” at 40 C.F.R. § 261.4(b)(7)(ii)(D) and is therefore a Bevill-excluded waste. Wastewaters generated at the Mosaic Facilities from phosphoric acid production processes, including non-ammoniated animal feed ingredients, are also Bevill-excluded pursuant to 40 C.F.R. § 261.4(b)(7)(ii)(P).

36. Wastewaters generated at the Mosaic Facilities from processes associated with MAP/DAP production, among others (chemical manufacturing), certain air pollution control scrubbers, and pipe, tank, or other process equipment cleaning and maintenance, are not Bevill-excluded process wastewaters. When these wastes at the Mosaic Facilities exhibit a hazardous characteristic pursuant to F.A.C. Rule 62-730.030(1) (40 C.F.R. Part 261, Subpart C), they are hazardous wastes.

A. GENERAL NEW WALES FACILITY ALLEGATIONS

Facility Process Description

37. The New Wales Facility is a production facility for phosphoric acid, sulfuric acid, DAP, MAP, granulated monoammonium phosphate (GMAP), and powdered monoammonium phosphate (PMAP), and the non-ammoniated animal feed ingredients monocalcium phosphate (Biofos) and tricalcium/defluorinated phosphate (Multifos).

38. The New Wales Facility has been in operation at its current location since March 1975. The facility is approximately 2,200 acres in size. The New Wales Facility was originally owned by IMC Phosphates, but was purchased by Cargill in 2002, which later became Mosaic Fertilizer on October 22, 2004.

39. The New Wales Facility manufactures annually approximately 3.9 million tons of MAP, DAP, GMAP and PMAP through mineral processing and chemical manufacturing methods.

40. Operations at the New Wales Facility fall into several categories, only some of which are mineral processing.

41. At the New Wales Facility, sulfuric acid is reacted with mineral phosphate rock to produce phosphoric acid (mineral processing). Different concentrations of phosphoric acid are blended to reach the desired phosphoric acid concentration and then reacted with ammonia to produce MAP, DAP, GMAP and PMAP (chemical manufacturing).

42. Biofos is produced by reacting defluorinated phosphoric acid with limestone. The process wastewater generated from this non-ammoniated animal feed ingredient production is subject to the Bevill Exclusion.

43. Multifos, a tricalcium phosphate product primarily used in poultry feed is produced by combining phosphate rock with soda ash and 45% phosphoric acid (blended from 54%

phosphoric acid and pond water). The process wastewater generate from this non-ammoniated animal feed ingredient production is subject to the Bevill Exclusion.

44. On December 9, 2003, EPA conducted a compliance evaluation inspection (CEI) at the New Wales Facility and received a compact disk containing sampling data on Sulfuric Acid Plant wastes generated from regenerating the ion exchange resin within demineralizer units from July 2002 to the date of inspection.

45. On November 16-17, 2004, EPA conducted a CEI, and on December 13-15, 2004, EPA conducted a Sampling Investigation (SI) at the New Wales Facility to determine the Facility's compliance with state and federal RCRA requirements.

Sulfuric Acid Production

46. The manufacturing of MAP, DAP, GMAP, PMAP, Biofos, or Multifos at the New Wales Facility begins with the production of sulfuric acid. New Wales produces sulfuric acid in five (5) sulfuric acid plants on-site (designated as Sulfuric Acid Plants #1, #2, #3, #4 and #5). The sulfuric acid is stored in large tanks until piped to the Phosphoric Acid Plant's three reactors for use.

47. Hazardous waste generated from the New Wales Facility's Sulfuric Acid Plants includes spills and leaks, as well as wastewater from regenerating the ion exchange resin within demineralizer units. The cationic exchange resin is regenerated with sulfuric acid and the anionic exchange resin is regenerated with sodium hydroxide. The New Wales Facility discharged the spills, leaks and corrosive hazardous regeneration wastewater to a concrete ditch that channeled the wastewaters beneath an equipment-cleaning area and a metal walkway before flowing through a spillway into an earthen ditch and then to an unlined earthen surface impoundment called the Stormwater Retention Pond.

48. Sulfuric acid is also used as an additive to process wastewater to aid in cleaning tanks, pipes, evaporators, and other production equipment.

49. Sulfuric acid manufacturing and storage is not mineral processing. Wastes generated from this process are not subject to the Bevill Exclusion.

Phosphoric Acid Production

50. Sulfuric acid is piped from the storage tanks in the Sulfuric Acid Plants to three phosphoric acid reactors within a single Phosphoric Acid Plant (designated as the Prayon East Reactor, the Prayon West Reactor, and the Prayon Third Reactor). In the reactors, the sulfuric acid is mixed with phosphate rock to produce weak phosphoric acid [approximately 30% phosphorus pentoxide (P_2O_5) (hereafter referred to as weak phosphoric acid)]. A by-product of the reaction is calcium sulfate dihydrate, typically referred to as phosphogypsum.

Phosphogypsum is separated from the weak phosphoric acid by filtration. To recover additional weak phosphoric acid, the filtered phosphogypsum is rinsed with process wastewater pumped from the ponds and ditches circling the phosphogypsum stack. After the third rinse with process wastewater, minimal additional phosphoric acid is recoverable from the phosphogypsum, so the rinsed phosphogypsum is mixed with water (slurried) and pumped to the 704-acre South phosphogypsum stack lined with 60-mil high density polyethylene (HDPE) for disposal.

51. To meet material specifications for phosphate fertilizer production, the New Wales Facility concentrates the 30% phosphoric acid in three stages. The first concentration step is achieved through evaporation, resulting in 40% phosphoric acid. The 40% phosphoric acid is further concentrated to 43% phosphoric acid through another evaporation step. The 43% phosphoric acid is ultimately concentrated to 54% phosphoric acid through a third evaporation step. If MGA is being produced, the solids within the 54% phosphoric acid are reduced to less

than one percent. A blend of the 30% phosphoric acid and 54% phosphoric acid is used in the MAP, DAP, GMAP and PMAP production processes described in paragraphs 55- 58 below.

52. Phosphoric acid production processes leading to the manufacture of MGA are mineral processing.

53. The diversion of phosphoric acid from MGA production for use in chemical manufacturing (MAP, DAP, GMAP and PMAP) is not mineral processing.

54. Contaminants are accumulated in the water used throughout production of phosphoric acid up to MGA, resulting in aqueous wastes referred to as "process wastewater." Prior to reuse in the various processes, the process wastewater must be cooled and excess contaminants must be removed. A majority of the excess contaminants precipitate (settle) from the wastewater as it cools in the phosphogypsum stack system. Approximately 86,600 gallons per minute (gpm) of process wastewater is sent from the phosphoric acid production plant to the phosphogypsum stack system for cooling and contaminant settling.

Fertilizer Production

55. MAP, DAP, GMAP and PMAP fertilizer products are manufactured at the facility in four (4) Plants designated as #1 DAP/MAP, #2 DAP, #3 GMAP and PMAP (collectively Fertilizer plants).

56. MAP, DAP and GMAP production consists of reacting a mixture of 30% phosphoric acid and 54% phosphoric acid with anhydrous ammonia in a reactor (pre-neutralizer). The resultant slurry is removed from the pre-neutralizer and pumped into a rotating drum granulator, where the product forms into round, solid, pebble-like granules. This solid material passes through a dryer followed by a system of sizing screens and mills to achieve the desired granule size. The product

is then cooled and stored. It is shipped off-site as bulk granular fertilizer for blending and use on farm crops.

57. PMAP production consists of reacting phosphoric acid with ammonia in a pipe reactor. The product is then cooled and stored.

58. Fertilizer plants' production operations are chemical manufacturing, not mineral processing, and as such solid wastes from these operations are not subject to the Bevill Exclusion.

Air Pollution Control Devices (Phosphoric Acid and Fertilizer Production)

59. Air particulates emitted from the phosphoric acid production process are captured ("scrubbed") from the reactors, filters, and other production equipment (e.g. clarifiers and storage tanks) using air pollution control devices commonly referred to as scrubbers. The scrubbing liquid for each of these scrubbers is process wastewater that is pumped from the phosphogypsum stack system through the scrubbers to collect particulate air emissions in a single pass through the scrubber before being discharged directly back into the phosphogypsum stack system.

60. Most of the ammonia and fugitive air particulates emitted from the pre-neutralizer, granulator, dryer, etc., during DAP/MAP, and PMAP production are captured in a series of scrubbers similar to the phosphoric acid scrubbers described above. Mosaic uses process wastewater from the phosphogypsum stack system in the secondary scrubbers in the #1 DAP/MAP, # 2 DAP, and PMAP plants, and uses fresh water in the scrubber for the #3 GMAP plant, to collect these particulate air emissions. The scrubber effluent is discharged back into the phosphogypsum stack system.

61. The operation of scrubbers is not part of mineral processing, and the wastewater from these scrubbers are not subject to the Bevill Exclusion. The wastewater from the #3 GMAP plant scrubber is not hazardous because fresh water is used in the scrubber.

Pipe and Tank Cleaning

62. Mosaic cleans its pipes, tanks, evaporators, and other process equipment throughout the phosphoric acid and fertilizer production areas on a regular basis, using process wastewater, phosphogypsum stack system wastewater, or a mixture of either with sulfuric acid as the cleaning agent. After use, the spent corrosive hazardous cleaning agent is discharged to the phosphogypsum stack system. Cleaning wastes are generated on a daily basis during normal plant operations and during scheduled maintenance periods.

63. Pipe and tank cleaning operations are not part of mineral processing, and the wastewater from such cleaning operations are not subject to the Bevill Exclusion.

Spills and Leaks of Sulfuric Acid and Phosphoric Acid

64. In Mosaic's phosphoric acid and fertilizer production, spills and leaks of phosphoric acid and sulfuric acid occur. These spills and leaks commingle with process wastewater being transported from the production areas to the phosphogypsum stack system.

65. Spills and leaks of sulfuric acid and phosphoric acid are not part of mineral processing and are therefore not subject to the Bevill Exclusion.

Phosphogypsum Stack System

66. As described above, Mosaic currently disposes of slurried phosphogypsum in a 704-acre phosphogypsum stack lined with 60-mil HDPE. The South phosphogypsum stack is located south of the closed 394-acre unlined North phosphogypsum stack.

67. The closed North phosphogypsum stack and the lined active South phosphogypsum stack described above operate in conjunction with the existing unlined cooling pond system (together this entire system is referred to as the phosphogypsum stack system). The unlined cooling pond system consists of a 280-acre main cooling pond located southeast of the production complex and the north, east, and west cooling channels that circulate process wastewater around the phosphogypsum stacks. Outside of the footprint of the phosphogypsum stack system, Mosaic operates a 94-acre below-grade auxiliary holding pond. Mosaic operates the phosphogypsum stack system under Industrial Wastewater Facility Permit Number FL0036421 issued by FDEP.

68. Mosaic's entire New Wales site is encompassed by a comprehensive groundwater monitoring system that is monitored and operated in accordance with an approved groundwater monitoring plan under Industrial Wastewater Facility Permit Numbers FL0036421 and FL0178527 issued by FDEP. The groundwater monitoring program began in 1987, and in 1989, IMC Fertilizer Inc., predecessor to Mosaic, entered into a consent order with the FDEP (then the Florida Department of Environmental Regulation) to evaluate the vertical and horizontal extent of groundwater impacts within and/or beyond its permitted zone of discharge resulting from waste management practices. In October 1992, Mosaic completed a Contamination Assessment Report that delineated the extent of contamination and risk to human health and the environment. As a result of the contamination assessment, Mosaic identified and sealed twelve former recharge well bore holes within the main cooling pond that were contributing to groundwater impacts.

69. In 1998, Florida enacted § 403.4155, F.S., which requires FDEP to promulgate rules related to closure and financial responsibility for phosphogypsum stacks. Rules were duly promulgated in Chapter 62-673, F.A.C. As a result, Mosaic is required by FDEP to annually

estimate the cost for closing the phosphogypsum stack system (including water treatment and management costs) at the end of the useful life of the facility and the cost associated with long-term monitoring of the effectiveness of closure (post-closure care or long-term care). Based on the estimated cost for closure and long-term care, Mosaic is required to establish Financial Assurance to guarantee the funds are available to close the facility at the end of the useful life. To meet its Financial Assurance obligations under Chapter 62-673, F.A.C., Mosaic established a corporate guarantee with FDEP.

NEW WALES FACILITY CLAIMS FOR RELIEF

i. First Claim for Relief

(Failure to Make Hazardous Waste Determinations)

70. The allegations in Paragraphs 1 through 69 are realleged and incorporated herein by reference.

71. Pursuant to F.A.C. Rule 62-730.160(1) (40 C.F.R. § 262.11), Defendant, as a generator of solid waste, is required to make a hazardous waste determination.

72. At the time of the December 9, 2003 CEI (and since July 2002), Defendant routinely generated wastewaters from regenerating demineralizer units for which hazardous waste determinations had not been made.

73. At the time of the November 16-17, 2004 CEI and the December 13-15, 2004 SI, Defendant routinely generated the following solid wastes for which hazardous waste determinations had not been made:

- a. Phosphoric Acid Plant scrubbers' effluent;
- b. #2 DAP Plant scrubbers' effluent;
- c. PMAP Plant scrubber effluent;

- d. Spent sulfuric acid and wastewaters generated from cleaning phosphoric acid production pipes and equipment;
- e. Wastewaters generated from cleaning the Fertilizer Plants' production pipes and equipment;
- f. Spills and leaks from phosphoric acid and fertilizer production.

74. Based on EPA's knowledge of the processes at the New Wales Facility, the December 9, 2003 and November 16-17, 2004 CEIs and the December 13-15, 2004 SI, EPA determined the following solid wastes are D002 hazardous wastes:

- a. Phosphoric Acid Plant scrubbers' effluent;
- b. PMAP Plant scrubber effluent;
- c. #2 DAP Plant scrubbers' effluent;
- d. Spent sulfuric acid and wastewaters generated from cleaning phosphoric acid production pipes and equipment;
- e. Wastewater generated from cleaning the Fertilizer Plants' production pipes and equipment;
- f. Wastewater generated from regenerating demineralizer units at the Sulfuric Acid Plants; and
- g. Spills and leaks from phosphoric acid and fertilizer production.

75. Defendant is liable for injunctive relief and civil penalties pursuant to Section 3008(a) of RCRA, 42 U.S.C. § 6928(a), and § 403.727, F.S., for each day that it failed to make a hazardous waste determination for solid wastes generated at its New Wales Facility in violation of F.A.C. Rule 62-730.160(1) (40 C.F.R. § 262.11).

ii. Second Claim for Relief

(Treatment, Storage and Disposal of Hazardous Waste in the Phosphogypsum Stack System, an Earthen Ditch and an Unlined Surface Impoundment (Stormwater Retention Pond) without a Permit or Interim Status in Violation of § 403.722 F.S. (Section 3005 of RCRA, 42 U.S.C. § 6925), and the applicable regulatory requirements found at F.A.C. Rules 62-730.180 and 62-730.220 (40 C.F.R. Part 264, Subparts A-G, K and CC, and Part 270)).

76. The allegations in Paragraphs 1 through 75 are realleged and incorporated herein by reference.

77. Section 403.722, F.S. (RCRA Section 3005(a), 42 U.S.C. § 6925(a)), and F.A.C. Rule 62-730.180 (40 C.F.R. Parts 264, Subparts A-G, K and CC, and 270), require, among other things, that the owner and operator of a hazardous waste management unit must have a permit or interim status for the treatment, storage and/or disposal of any hazardous waste during the active life of the unit.

78. Since at least November 16, 2004 and continuing to at least the date of the filing of this Complaint, Defendant has routinely treated, stored and disposed of the following D002 hazardous wastes in the New Wales Facility's phosphogypsum stack system:

- a. Phosphoric Acid Plant scrubbers' effluent;
- b. PMAP Plant scrubber effluent;
- c. #2 DAP Plant scrubbers' effluent;
- d. Spent sulfuric acid and wastewaters generated from cleaning phosphoric acid production pipes and equipment;
- e. Wastewater generated from cleaning the Fertilizer Plants' production pipes and equipment; and
- f. Spills and leaks from phosphoric acid, and fertilizer production.

79. Since at least July 2002 and continuing to at least November 2004, Defendant routinely treated, stored and disposed of wastewater generated from regenerating demineralizer units associated with the Sulfuric Acid Plants, a D002 hazardous waste, in an earthen ditch and the Stormwater Retention Pond.

80. Since at least July 2002 Defendant has operated its Facility's earthen ditch and Stormwater Retention Pond, as hazardous waste management units, i.e., surface impoundments, and is subject to the hazardous waste requirements at Chapter 62-730, F.A.C. (40 C.F.R. Part 264, Subparts A-G, K (Surface Impoundments), CC (Air Emission Standards for Tanks, Surface Impoundments and Containers)).

81. Since at least November 2004, Defendant has operated its Facility's phosphogypsum stack system, as a hazardous waste management unit, i.e., surface impoundment, and is subject to the hazardous waste requirements at Chapter 62-730, F.A.C. (40 C.F.R. Part 264, Subparts A-G, K (Surface Impoundments), CC (Air Emission Standards for Tanks, Surface Impoundments and Containers)).

82. Defendant has neither a RCRA hazardous waste permit nor interim status for treatment, storage or disposal of hazardous waste in its phosphogypsum stack system, earthen ditch, or Stormwater Retention Pond, and is therefore in violation of § 403.722, F.S. (Section 3005 of RCRA, 42 U.S.C. § 6925), and the applicable regulatory requirements found at F.A.C. Rules 62-730.180 and 62-730.220, (40 C.F.R. Part 264, Subparts A-G, K and CC, and Part 270).

83. Defendant is liable for injunctive relief and civil penalties pursuant to Section 3008(a) of RCRA, 42 U.S.C. § 6928(a), and § 403.727, F.S. for each day that it treated, stored, and/or disposed of hazardous waste in its phosphogypsum stack system, earthen ditch, and Stormwater Retention Pond at its New Wales Facility without a permit or interim status.

iii. Third Claim for Relief

(Failure to Perform Land Disposal Determinations)

84. The allegations in Paragraphs 1 through 83 are realleged and incorporated herein by reference.

85. Pursuant to F.A.C. Rule 62-730.183 (40 C.F.R. § 268.7(a)(1)), Defendant is required, among other things, to determine if its hazardous waste needs to be treated before it can be land disposed.

86. Since at least July 2002 and continuing to at least November 2004, Defendant routinely generated hazardous wastewaters from regenerating demineralizer units at the Sulfuric Acid Plants and failed to determine whether this waste must be treated before it can be land disposed.

87. Since at least November 2003 and continuing to at least the date of filing of this Complaint, Defendant has routinely generated the following hazardous wastes and failed to determine if these wastes must be treated before they can be land disposed:

- a. Phosphoric Acid Plant scrubbers' effluent;
- b. PMAP Plant scrubber effluent;
- c. #2 DAP Plant scrubbers' effluent;
- d. Spent sulfuric acid and wastewaters generated from cleaning phosphoric acid production pipes and equipment;
- e. Wastewaters generated from cleaning the Fertilizer Plants' production pipes and equipment; and
- f. Spills and leaks from phosphoric acid and fertilizer production.

88. Defendant is liable for injunctive relief and civil penalties pursuant to Section 3008(a) of RCRA, 42 U.S.C. § 6928(a), and § 403.727, F.S. for each day that it failed to determine if these

hazardous wastes generated at its New Wales Facility must be treated before they can be land disposed. Each such failure is a violation of F.A.C. Rule 62-730.183 (40 C.F.R. § 268.7(a)(1)).

iv. *Fourth Claim for Relief*

(Failure to Meet Land Disposal Restrictions for Prohibited Hazardous Wastes)

89. The allegations in Paragraphs 1 through 88 are realleged and incorporated herein by reference.

90. Pursuant to F.A.C. Rule 62-730.183 (40 C.F.R. § 268.9(c)), Defendant, among other things, is prohibited from land disposing a waste that exhibits a hazardous characteristic under F.A.C. Rule 62-730.030(1) (40 C.F.R. Part 261, Subpart C), unless the waste complies with the treatment standards under F.A.C. Rule 62-730.183 (40 C.F.R. Part 268, Subpart D).

91. Pursuant to F.A.C. Rule 62-730.183 (40 C.F.R. Part 268, Subpart D). D002 wastewaters, must meet the DEACT treatment standard before the waste can be disposed.

92. Pursuant to F.A.C. Rule 62-730.183 (Subpart D of 40 C.F.R. Part 268), the “Universal Treatment Standards” regulations, require, among other things, that prohibited wastewaters must contain no more than 1.4 milligrams per liter (mg/L) of arsenic; no more than 0.69 mg/L of cadmium; and no more than 2.77 mg/L of chromium to be land disposed.

93. Based on the results of the November 16-17, 2004 CEI and the December 13-15 2004 SI, and EPA’s knowledge of the composition of the Mosaic New Wales Facility’s effluent, Mosaic was land disposing the following hazardous wastes in the phosphogypsum stack system, which wastes did not meet the DEACT standard for D002 (corrosivity) or the Universal Treatment Standard of 1.4 milligrams per liter (mg/L) of arsenic; 0.69 mg/L cadmium; and 2.77 mg/L of chromium prior to land disposal:

- a. Phosphoric Acid Plants scrubbers' effluent;
- b. PMAP Plant scrubber effluent;
- c. #2 DAP Plant scrubbers' effluent;
- d. Spent sulfuric acid and wastewaters generated from cleaning phosphoric acid production pipes and equipment;
- e. Wastewaters generated from cleaning the Fertilizer Plants' production pipes and equipment; and
- f. Spills and leaks from phosphoric acid and fertilizer production.

94. Since at least July 2002 and continuing to at least November 2004, Defendant disposed of hazardous wastewaters from regenerating demineralizer units at the sulfuric acid plants into an earthen ditch and the Stormwater Retention Pond, and did not meet the DEACT standard for D002 prior to land disposal.

95. Defendant is liable for injunctive relief and civil penalties pursuant to Section 3008(a) of RCRA, 42 U.S.C. § 6928(a), and § 403.727, F.S., for each day that it failed to meet the standards set forth at F.A.C. Rule 62-730.183 (40 C.F.R. Part 268, Subpart D) prior to land disposing prohibited waste in the phosphogypsum stack system, earthen ditch, and the Stormwater Retention Pond at the New Wales Facility, in violation of F.A.C. Rule 62-730.183 (40 C.F.R. § 268.9(c), and Part 268, Subpart D).

v. **Fifth Claim for Relief**

(Failure to Prepare an Adequate Cost Estimate for Closure)

96. The allegations in Paragraphs 1 through 95 are realleged and incorporated herein by reference.

97. Pursuant to F.A.C. Rule 62-730.180(1) (40 C.F.R. § 264.140(a)), each owner or operator is required to meet the requirements of F.A.C. Rule 62-730.180(1) (40 C.F.R. § 264.142) (Cost Estimate for Closure).

98. Pursuant to F.A.C. Rule 62-730.180(1) (40 C.F.R. § 264.142(a)), each owner or operator must have a detailed written estimate, in current dollars, of the cost of closing the facility in accordance with the requirements in 40 C.F.R. §§ 264.111 through 264.115, and the other applicable closure requirements listed in 40 C.F.R. § 264.142(a).

99. Since at least the December 9, 2003 and November 16-17, 2004 CEIs and the December 13-15, 2004 SI, and continuing through at least the date of the filing of this Complaint, Defendant had not established an adequate cost estimate for closure of its New Wales Facility phosphogypsum stack system in violation of the requirements of F.A.C. Rule 62-730.180(1) (40 C.F.R. §§ 264.111 through § 264.115), and the other applicable closure requirements listed in 40 C.F.R. § 264.142(a).

100. Defendant is liable for injunctive relief and civil penalties pursuant to Section 3008(a) of RCRA, 42 U.S.C. § 6928(a), and the § 403.727, F.S. for each day that it failed to have an adequate cost estimate for the closure of its New Wales Facility phosphogypsum stack system.

vi. Sixth Claim for Relief

(Failure to Establish Adequate Financial Assurance for Closure)

101. The allegations in Paragraphs 1 through 100 are realleged and incorporated herein by reference.

102. Pursuant to F.A.C. Rule 62-730.180(1) (40 C.F.R. §§ 264.140(a)), each owner or operator of a treatment, storage and disposal facility must establish financial assurance for closure of the facility (Financial Assurance for Closure).

103. Pursuant to F.A.C. Rule 62-730.180(1) (40 C.F.R. §§ 264.143(a)), the owner or operator must choose from the options set forth at 40 C.F.R. § 264.143(a) through (f) and F.A.C. Rule 62-730.226(5) and (6).

104. Since at least the December 9, 2003 and November 16-17, 2004 CEIs and the December 13-15, 2004 SI, and continuing through at least the date of the filing of this Complaint, Defendant had not established adequate financial assurance for closure of its hazardous waste units (phosphogypsum stack system, earthen ditch and Stormwater Retention Pond) at its New Wales Facility in violation of F.A.C. Rule 62-730.180(1) (40 C.F.R. § 264.143(a) through (f)).

105. Defendant is liable for injunctive relief and civil penalties pursuant to Section 3008(a) of RCRA, 42 U.S.C. § 6928(a), and § 403.727, F.S. for each day that it failed to establish adequate financial assurance for closure of its New Wales Facility phosphogypsum stack system.

vii. Seventh Claim for Relief

(Failure to Prepare an Adequate Cost Estimate for Post-Closure Care)

106. The allegations in Paragraphs 1 through 105 and are realleged and incorporated herein by reference.

107. Pursuant to F.A.C. Rule 62-730.180(1) (40 C.F.R. 40 C.F.R. § 264.140(b)), each owner or operator of disposal facilities, piles, surface impoundments, tank systems and containment buildings must prepare a cost estimate for post closure of its facility to meet the requirements of F.A.C. Rule 62-730.180(1) (40 C.F.R. § 264.144) (Cost Estimate for Post-Closure Care).

108. Pursuant to F.A.C. Rule 62-730.180(1) (40 C.F.R. § 264.144(a)), the owner or operator of a disposal surface impoundment required under 40 C.F.R. § 264.228 to prepare a contingent closure and post-closure plan, must have a detailed written estimate, in current dollars, of the

annual cost of post-closure monitoring and maintenance of the facility in accordance with F.A.C. Rule 62-730.180(1) (40 C.F.R. §§ 264.117 through 264.120, and 40 C.F.R. § 264.228).

109. Since at least the December 9, 2003 and November 16-17, 2004 CEIs and the December 13-15, 2004 SI, and continuing through at least the date of the filing of this Complaint, Defendant did not have an adequate detailed written estimate, in current dollars, of the annual cost for post-closure monitoring and maintenance of its New Wales Facility phosphogypsum stack system in accordance with the applicable post-closure regulations set forth at F.A.C. Rule 62-730.180(1) (40 C.F.R. §§ 264.117 through 264.120, and 40 C.F.R. § 264.228).

110. Defendant is liable for injunctive relief and civil penalties pursuant to Section 3008(a) of RCRA, 42 U.S.C. § 6928(a), and the § 403.727, F.S. for each day that it failed to prepare an adequate post-closure care cost estimate for its New Wales Facility phosphogypsum stack system.

viii. Eighth Claim for Relief

(Failure to Establish Adequate Financial Assurance for Post-Closure Care)

111. The allegations in Paragraphs 1 through 110 are realleged and incorporated herein by reference.

112. Pursuant to F.A.C. Rule 62-730.180(1) (40 C.F.R. § 264.140(b)), each owner or operator of disposal facilities, piles, surface impoundments, tank systems and containment buildings are required to meet the requirements of F.A.C. Rule 62-730.180(1) (40 C.F.R. 264.145) and F.A.C. Rule 62-730.226 (Financial Assurance for Post-Closure Care).

113. Pursuant to F.A.C. Rule 62-730.180(1) (40 C.F.R. § 264.145), the owner or operator of a hazardous waste unit subject to the requirements of 40 C.F.R. § 264.144 must establish financial assurance for post-closure care in accordance with the approved post-closure plan for its facility

60 days prior to the initial receipt of hazardous waste or the effective date of the regulation, whichever is later.

114. Since at least the December 9, 2003 and November 16-17, 2004 CEIs and the December 13-15, 2004 SI, and continuing through at least the date of the filing of this Complaint, Defendant was subject to the requirements of F.A.C. Rule 62-730.180(1) (40 C.F.R. § 264.145) and had not established adequate financial assurance for post-closure care.

115. Defendant is liable for injunctive relief and civil penalties pursuant to Section 3008(a) of RCRA, 42 U.S.C. § 6928(a), and § 403.727, F.S. for each day that it failed to establish adequate financial assurance for post-closure care of its New Wales Facility phosphogypsum stack system.

ix. Ninth Claim for Relief

(Failure to Establish Adequate Financial Responsibility for Third Party Liability)

116. The allegations in Paragraphs 1 through 115 are realleged and incorporated herein by reference.

117. Owners and operators of treatment, storage and disposal facilities are required by F.A.C. Rule 62-730.180(1) (40 C.F.R. § 264.140(a)) to meet the requirements of F.A.C. Rule 62-730.226 and 40 C.F.R. § 264.147(a) (Liability Requirements).

118. Pursuant to F.A.C. Rule 62-730.180(1) (40 C.F.R. § 264.147(a)), the owner or operator of each treatment, storage and disposal facility must establish financial responsibility for bodily injury and property damage to third parties caused by sudden accidental occurrences arising from operations of the facility, and must choose from the options as specified in paragraphs (a) (1) through (6) of 40 C.F.R. § 264.147 and F.A.C. Rule 62-730.180(1).

119. Owners and operators of surface impoundments, landfills, land treatment facilities, or hazardous waste disposal miscellaneous units are required by F.A.C. Rule 62-730.180(1) (40

C.F.R. § 264.140(a)), to meet the requirements of F.A.C. Rule 62-730.226, and 40 C.F.R.

§ 264.147(b) (Liability Requirements).

120. Pursuant to F.A.C. Rule 62-730.180(1) (40 C.F.R. § 264.147(b)), owners or operators of each surface impoundment, landfill, land treatment facility, or hazardous waste disposal miscellaneous unit must establish financial responsibility for bodily injury and property damage to third parties caused by non-sudden accidental occurrences arising from operations of the facility, and must choose from the options as specified in paragraphs (b) (1) through (6) of 40 C.F.R. § 264.147 and F.A.C. Rule 62-730.180(1).

121. Pursuant to F.A.C. Rule 62-730.180(1) (40 C.F.R. § 264.147(b)), owners and operators who are subject to 40 C.F.R. § 264.147(b) may combine coverage for sudden and non-sudden accidental occurrences.

122. Since at least the December 9, 2003 and November 16-17, 2004 CEIs and the December 13-15, 2004 SI, and continuing through at least the date of the filing of this Complaint, Defendant had not established adequate financial responsibility for third party liability for sudden or non-sudden accidental occurrences using any of the options specified in paragraphs (a)(1) through (6) or (b)(1) through (6) of 40 C.F.R. § 264.147 as required by F.A.C. Rule 62-730.180(1).

123. Defendant is liable for injunctive relief and civil penalties pursuant to Section 3008(a) of RCRA, 42 U.S.C. § 6928(a), and § 403.727, F.S. for each day that it failed to establish adequate financial responsibility for third party liability at its New Wales Facility. Such failure is in violation of F.A.C. Rule 62-730.180(1) (40 C.F.R. § 264.147).

B. GENERAL RIVERVIEW FACILITY ALLEGATIONS

Facility Process Description

124. The Riverview Facility is a production facility for sulfuric acid, phosphoric acid, MAP, DAP, fluorosilicic acid (FSA) and animal feed ingredients (AFI).

125. The Riverview Facility has been in operation at the current approximate 866-acre site since 1925. The Riverview Facility was originally owned by Gardiner Inc. Cargill Fertilizer, Inc., a predecessor in interest to Cargill Fertilizer, LLC, purchased the Facility from Gardiner, Inc. in 1985. On October 22, 2004, Cargill Fertilizer, LLC became Mosaic Fertilizer, LLC.

126. The Riverview Facility manufactures sulfuric acid, phosphoric acid, MAP, DAP, FSA, and AFI through mineral processing and chemical manufacturing methods described in paragraphs 132-144 below.

127. At the Riverview Facility, sulfuric acid is reacted with mineral phosphate rock to produce phosphoric acid (mineral processing). Different concentrations of phosphoric acid are then reacted with ammonia to produce MAP or DAP (chemical manufacturing).

128. Fluoride vapors emitted during the phosphoric acid evaporation steps are captured, condensed, and concentrated to produce FSA (chemical manufacturing).

129. Phosphoric acid is defluorinated and reacted with limestone to produce AFI. The production of non-ammoniated AFI is subject to the Bevill Exclusion.

130. Operations at the Riverview Facility fall into several categories, only some of which are mineral processing.

131. On December 8, 2003, EPA conducted a CEI, on March 1, 2005, EPA conducted a CEI, and on May 10-11, 2005, EPA conducted a SI at the Riverview Facility to determine the Facility's compliance with state and federal RCRA requirements.

Sulfuric Acid Production

132. The manufacturing of phosphoric acid, FSA, MAP, DAP, and AFI at the Riverview Facility begins with the production of sulfuric acid. The Riverview Facility produces sulfuric acid in three (3) Sulfuric Acid Plants on-site. The sulfuric acid is stored in large tanks until piped to the Phosphoric Acid Plant's two reactors for use in digesting the phosphate rock to produce phosphoric acid.

133. Sulfuric acid is also used to clean production and storage equipment, mainly evaporators and pipes.

134. Sulfuric acid production is not a mineral processing activity and is not subject to the Bevill Exclusion.

Phosphoric Acid Production

135. Phosphate rock is received from the Defendant's mines by truck or rail car.

136. Sulfuric acid is piped from the storage tanks in the Sulfuric Acid Plants to two phosphoric acid reactors within a single Phosphoric Acid Plant (designated as the Prayon Reactor and the Dorcco Reactor). In the reactors, the sulfuric acid is mixed with phosphate rock to produce weak phosphoric acid [approximately 30% phosphorus pentoxide (P_2O_5) (hereafter referred to as weak phosphoric acid)]. A by-product of the reaction is calcium sulfate dihydrate, typically referred to as phosphogypsum. Phosphogypsum is separated from the weak phosphoric acid by filtration. To recover additional weak phosphoric acid, the filtered phosphogypsum is rinsed with process wastewater pumped from the HDPE-lined ponds and ditches circling the phosphogypsum stack. After rinsing with process wastewater, minimal additional phosphoric acid is recoverable from the phosphogypsum, so the rinsed phosphogypsum is mixed with water (slurried) and pumped to the 480 acre HDPE-lined phosphogypsum stack for disposal.

137. To meet material specifications for phosphate fertilizer production, the Riverview Facility concentrates the 30% phosphoric acid in two stages. The first concentration step is achieved through evaporation, resulting in 43% phosphoric acid. The 43% phosphoric acid is ultimately concentrated to 54% phosphoric acid through a second evaporation step. A blend of the 30% phosphoric acid and the 54% phosphoric acid is used in the MAP and DAP production processes described in paragraphs 141-144 below.

138. Phosphoric acid production processes leading to the manufacture of MGA are mineral processing.

139. The diversion of phosphoric acid from MGA production for use in chemical manufacturing (FSA, MAP, DAP) is not mineral processing.

140. Contaminants are accumulated in the water used throughout production of phosphoric acid up to MGA, resulting in aqueous wastes referred to as "process wastewater." Prior to reuse in the various processes, the process wastewater must be cooled and excess contaminants must be removed. A majority of the excess contaminants precipitate (settle) from the wastewater as it cools in the phosphogypsum stack system. Approximately 60,000 gallons per minute (gpm) of process wastewater is sent from the phosphoric acid production plant to the phosphogypsum stack system for cooling and contaminant settling.

Fertilizer Production

141. MAP and DAP fertilizer products are manufactured at the facility in two (2) Plants designated as #5 DAP and #6 DAP/MAP (collectively, Fertilizer Plants).

142. DAP production consists of reacting a mixture of 30% phosphoric acid and 54% phosphoric acid with anhydrous ammonia in a reactor ("pre-neutralizer"). The resultant slurry is removed from the pre-neutralizer and pumped into a rotating drum granulator, where the product

forms into round, solid, pebble-like granules. This solid material then passes through a dryer followed by a system of sizing screens and mills to achieve the desired granule size. The product is then cooled and stored. It is shipped offsite as bulk granular fertilizer for blending and use on farm crops.

143. During the production of phosphoric acid up to MGA, an impure phosphoric acid with high solids is generated. This high solids phosphoric acid is reacted with ammonia in a spray tower to produce MAP. The resultant product is dried and ground.

144. The Fertilizer Plants' production operations are chemical manufacturing, not mineral processing and as such are not subject to the Bevill Exclusion.

Air Pollution Control Device (Phosphoric Acid and Fertilizer Production)

145. Air particulates emitted from the phosphoric acid production process are captured ("scrubbed") from the reactors, filters, and other production equipment (e.g. clarifiers and storage tanks) using air pollution control devices commonly referred to as scrubbers. The scrubbing liquid for scrubbers at the Riverview Facility is process wastewater that is pumped from the phosphogypsum stack system through the scrubbers to collect particulate air emissions in a single pass through the scrubbers before being discharged directly back into the phosphogypsum stack system.

146. Most of the ammonia and fugitive air particulates emitted from the pre-neutralizer, granulator, dryer, etc., during MAP and DAP production are captured in a series of scrubbers similar to the phosphoric acid scrubbers described above. Mosaic uses process wastewater from the phosphogypsum stack system in the last stage of air scrubbing (tail gas scrubbers) in the Fertilizer Plants to collect these particulate air emissions. At the Riverview Facility, process wastewater is pumped from the cooling pond system to a combined header that splits the process

wastewater and sends part of it to the tail gas scrubber in the #5 DAP Plant and the other half to the tail gas scrubber in the #6 DAP/MAP Plant. The effluent from the tail gas scrubbers combines to a single flow that is returned to the phosphogypsum stack system cooling pond system.

147. The operation of scrubbers is not part of mineral processing, and the wastewater from these scrubbers are not subject to the Bevill Exclusion.

FSA Production

148. The Riverview Facility produces FSA depending on market conditions.

149. FSA is produced from the vapors emitted during the first and second stage evaporation of phosphoric acid. In the first stage, each evaporator is equipped with a FSA recovery unit, also called a "Swift Tower." The gas is condensed in the Swift Tower and continuously strengthened until the desired strength of FSA is obtained, typically a 24 to 25% solution, at which time it is transferred to a receiving tank.

150. FSA solutions meeting customer specifications in the receiving tank are transferred to storage tanks and sold to customers off-site.

151. At the time of the December 8, 2003 and March 1, 2005 CEIs, and the May 10-11, 2005 SI, Defendant discharged FSA solutions not meeting customer specifications to the process wastewater system.

152. FSA production is not a mineral processing activity and as such is not subject to the Bevill Exclusion.

Pipe and Tank Cleaning

153. Mosaic cleans its pipes, tanks, evaporators, and other process equipment throughout the phosphoric acid and fertilizer production areas on a regular basis, using process wastewater,

phosphogypsum stack system wastewater, or a mixture of either with sulfuric acid as the cleaning agent. After use, the spent corrosive hazardous cleaning agent is discharged to the phosphogypsum stack system. Cleaning wastes are generated on a daily basis during normal plant operations and during scheduled maintenance periods.

154. Pipe and tank cleaning operations are not part of mineral processing and the wastes generated from such cleaning operations are not subject to the Bevill Exclusion.

Phosphogypsum Stack System

155. Mosaic disposes of slurried phosphogypsum in a 370-acre clay-lined phosphogypsum stack. A 110 acre expansion to the 370-acre phosphogypsum stack is lined with 60-mil HDPE. The phosphogypsum stack and the expansion are located northeast of the facility, across US Hwy 41.

156. The 480-acre combined lined phosphogypsum stack operates in conjunction with a 160-acre process wastewater system that is lined with 80-mil HDPE. The process wastewater system consists of a 32-acre transfer pond located directly east of the production complex, and the pond's connecting ditches. Mosaic operates the pond system under Industrial Wastewater Facility Permit Number FL0000761 issued by FDEP.

157. Mosaic's entire Riverview Facility is encompassed by a comprehensive groundwater monitoring system that is monitored and operated in accordance with an approved groundwater monitoring plan under Industrial Wastewater Facility Permit Numbers FL0000761 and FL0177130 issued by FDEP.

158. In 1998, Florida enacted § 403.4155, F.S., which required FDEP to promulgate rules related to closure and financial responsibility for phosphogypsum stacks. Rules were duly promulgated in Chapter 62-673, F.A.C. As a result, Mosaic is required annually to estimate the

cost for closing the phosphogypsum stack system (including water treatment and management costs) at the end of the useful life of the facility and the cost associated with long-term monitoring of the effectiveness of closure (post-closure care or long-term care). Based on the estimated cost for closure and long-term care, Mosaic is required to establish Financial Assurance to guarantee the funds are available to close the facility at the end of the useful life. To meet its Financial Assurance obligations under Chapter 62-673, F.A.C., Mosaic established a corporate guarantee with FDEP.

Spills & Leaks of Sulfuric Acid, Phosphoric Acid and FSA

159. In Mosaic's phosphoric acid and fertilizer production areas, spills and leaks of sulfuric acid, phosphoric acid and FSA occur. These spills and leaks are commingled with process wastewater being transported from the production areas to the phosphogypsum stack system.

160. Spills and leaks of sulfuric acid, phosphoric acid and FSA are not part of mineral processing and are therefore not subject to the Bevill Exclusion.

THE RIVERVIEW FACILITY CLAIMS FOR RELIEF

x. Tenth Claim for Relief

(Failure to Make Hazardous Waste Determinations)

161. The allegations in Paragraphs 1 through 36 and 124 through 160 are realleged and incorporated herein by reference.

162. Pursuant to F.A.C. Rule 62-730.160(1) (40 C.F.R. § 262.11), Defendant, as a generator of solid waste, is required to make a hazardous waste determination.

163. At the time of the December 8, 2003 and March 1, 2005 CEIs, and the May 10-11, 2005 SI, Defendant routinely generated the following solid wastes for which hazardous waste determinations had not been made:

- a. Phosphoric Acid Plant scrubbers' effluent;
- b. #5 DAP Plant reactor/granulator/cooler equipment scrubber effluent;
- c. # 5 DAP Plant dryer unit scrubber effluent;
- d. #6 DAP Plant dryer unit scrubber effluent;
- e. #6 DAP Plant cooler unit scrubber effluent;
- f. Spent sulfuric acid and wastewaters generated from the cleaning of phosphoric acid production pipes and equipment;
- g. Wastewaters generated from cleaning the Fertilizer Plants' and FSA production pipes and equipment;
- h. Spills and leaks from phosphoric acid and fertilizer production; and
- i. FSA not meeting customer specifications (wastewater).

164. Based on EPA's knowledge of the processes at the Riverview Facility and the December 8, 2003 and March 1, 2005 CEIs and May 10-11, 2005 SI, EPA determined the following solid wastes are D002 hazardous wastes:

- a. Phosphoric Acid Plant scrubbers' effluent;
- b. #5 DAP Plant reactor/granulator/cooler equipment scrubber effluent;
- c. #5 DAP Plant dryer unit scrubber effluent;
- d. #6 DAP Plant dryer unit scrubber effluent;
- e. #6 DAP Plant cooler unit scrubber effluent;
- f. Spent sulfuric acid and wastewaters generated from the cleaning of phosphoric acid production pipes and equipment;
- g. Wastewaters generated from cleaning the Fertilizer Plants' and FSA production pipes and equipment;

- h. Spills and leaks from phosphoric acid and fertilizer production; and
- i. FSA not meeting customer specifications (wastewater).

165. Defendant is liable for injunctive relief and civil penalties pursuant to Section 3008(a) of RCRA, 42 U.S.C. § 6928(a), and § 403.727, F.S., for each day it failed to make a hazardous waste determination for solid wastes generated at its Riverview Facility as required by F.A.C. Rule 62-730.160(1) (40 C.F.R. § 262.11).

xi. **Eleventh Claim for Relief**

(Treatment, Storage and Disposal of Hazardous Waste in the Phosphogypsum Stack System Without a Permit or Interim Status in Violation of § 403.722 F.S. ((Section 3005 of RCRA, 42 U.S.C. § 6925) and the applicable regulatory requirements found at F.A.C. Rules 62-730.180 and 62-730.220 (40 C.F.R. Part 264, Subparts A-G, K and CC, and Part 270)).

166. The allegations in Paragraphs 1 through 36 and 124 through 165 are realleged and incorporated herein by reference.

167. Section 403.722 F.S. (RCRA Section 3005(a), 42 U.S.C. § 6925(a)), and F.A.C. Rule 62-730.180 (40 C.F.R. Parts 264, Subparts A-G, K and CC, and 270), require, among other things, that the owner and operator of a hazardous waste management unit must have a permit or interim status for the treatment, storage and/or disposal of any hazardous waste during the active life of the unit.

168. Since at least March 2005 and continuing to at least the filing date of this Complaint, Defendant routinely treated, stored and disposed of the following D002 hazardous wastes in the Riverview Facility's phosphogypsum stack system:

- a. Phosphoric Acid Plant scrubbers' effluent;
- b. #5 DAP Plant reactor/granulator/cooler equipment scrubber effluent;
- c. #5 DAP Plant dryer unit scrubber effluent;

- d. #6 DAP Plant dryer unit scrubber effluent;
- e. #6 DAP Plant cooler unit scrubber effluent;
- f. Spent sulfuric acid and wastewaters generated from the cleaning of phosphoric acid production pipes and equipment;
- g. Wastewaters generated from cleaning the Fertilizer Plants' and FSA production pipes and equipment;
- h. Spills and leaks from phosphoric acid and fertilizer production; and
- i. FSA not meeting customer specifications (wastewater).

169. Defendant has neither a RCRA hazardous waste permit nor interim status for treatment, storage or disposal of hazardous waste in its phosphogypsum stack system in violation of § 403.722, F.S. (Section 3005 of RCRA, 42 U.S.C. § 6925) and the applicable regulatory requirements of F.A.C. Rules 62-730.180 and 62.730.220 (40 C.F.R. Parts 264, Subparts A-G, K, and CC, and 270).

170. Defendant is liable for injunctive relief and civil penalties pursuant to Section 3008(a) of RCRA, 42 U.S.C. § 6928(a), and § 403.727, F.S. for each day that it treated, stored, and/or disposed of hazardous waste in its phosphogypsum stack system at its Riverview Facility without a permit or interim status.

xii. Twelfth Claim for Relief

(Failure to Perform Land Disposal Determinations)

171. The allegations in Paragraphs 1 through 36 and 124 through 170 are realleged and incorporated herein by reference.

172. Pursuant to F.A.C. Rule 62-730.183 (40 C.F.R. § 268.7(a)(1)), Defendant is required, among other things, to determine if its hazardous waste needs to be treated before it can be land disposed.

173. Since at least March 2005 and continuing to at least the date of filing of this Complaint, Defendant routinely generated the following D002 hazardous wastes and failed to determine whether these wastes must be treated before they can be land disposed:

- a. Phosphoric Acid Plant scrubbers' effluent;
- b. Spent sulfuric acid and wastewaters generated from the cleaning of phosphoric acid production pipes and equipment;
- c. Wastewaters generated from cleaning the Fertilizer Plants' and FSA production pipes and equipment;
- d. Spills and leaks from phosphoric acid and fertilizer production; and
- e. FSA not meeting customer specifications (wastewater).

174. Since at least March 2005 and continuing to at least April 2014, Defendant routinely generated the following D002 hazardous wastes and failed to determine whether these wastes must be treated before they can be land disposed:

- a. #5 DAP Plant reactor/granulator/cooler equipment scrubber effluent; and
- b. #5 DAP Plant dryer unit scrubber effluent.

175. Since at least 2005 and continuing to at least April 2013, Defendant routinely generated the following D002 hazardous wastes and failed to determine whether these wastes must be treated before they can be land disposed:

- a. #6 DAP Plant dryer unit scrubber effluent; and
- b. #6 DAP Plant cooler unit scrubber effluent.

176. Defendant has violated F.A.C. Rule 62-730.183 (40 C.F.R. § 268.7(a)(1) for failure to make hazardous waste determinations before land disposal.

177. Defendant is liable for injunctive relief and civil penalties pursuant to Section 3008(a) of RCRA, 42 U.S.C. § 6928(a), and § 403.72, F.S. for each day that it failed to determine whether these hazardous wastes generated at its Riverview Facility must be treated before they can be land disposed.

xiii. Thirteenth Claim for Relief

(Failure to Meet Land Disposal Restrictions for Prohibited Hazardous Wastes)

178. The allegations in Paragraphs 1 through 36 and 124 through 177 are realleged and incorporated herein by reference.

179. Pursuant to F.A.C. Rule 62-730.183 (40 C.F.R. § 268.9(c)), Defendant, among other things, is prohibited from land disposing a waste that exhibits a characteristic under F.A.C. Rule 62-730.030(1) (40 C.F.R. Part 261, Subpart C) unless the waste complies with the treatment standards under F.A.C. Rule 62-730.183 (40 C.F.R. Part 268, Subpart D).

180. Pursuant to F.A.C. Rule 62-730.183 (40 C.F.R. Part 268, Subpart D), D002 corrosive wastewaters, must meet the DEACT code before the waste can be land disposed.

181. Since at least March 2005 and continuing to at least the date of the filing of this Complaint, Mosaic was land disposing the following hazardous wastes in the phosphogypsum stack system, which wastes did not meet the DEACT treatment standard prior to land disposal:

- a. Phosphoric Acid Plant scrubbers' effluent;
- b. Wastewaters generated from the cleaning of phosphoric acid production pipes and equipment;

- c. Wastewaters generated from the cleaning of the MAP and DAP Plants' and FSA production equipment;
- d. Spills and leaks from phosphoric acid and fertilizer production; and
- e. FSA not meeting customer specifications (wastewater).

182. Since at least March 2005 and continuing until at least April 2014, Mosaic was land disposing the following hazardous wastes in the phosphogypsum stack system, which wastes did not meet the DEACT treatment standard prior to land disposal:

- a. #5 DAP Plant reactor/granulator/cooler/equipment scrubber effluent; and
- b. #5 DAP Plant dryer unit scrubber effluent.

183. Since at least March 2005 and continuing April 2013, Mosaic was land disposing the following hazardous wastes in the phosphogypsum stack system, which wastes did not meet the DEACT treatment standard prior to land disposal:

- a. #6 DAP Plant dryer unit scrubber effluent; and
- b. #6 DAP Plant cooler unit scrubber effluent.

184. Defendant is liable for injunctive relief and civil penalties pursuant to Section 3008(a) of RCRA, 42 U.S.C. § 6928(a), and § 403.727, F.S., for failure to meet the standards set forth at F.A.C. Rule 62-730.183 (40 C.F.R. § 268.40(a) prior to land disposing prohibited waste in its phosphogypsum stack system at the Riverview Facility, in violation of F.A.C. Rule 62-730.183 (40 C.F.R. §§ 268.9(c) and 268.40(a)).

xiv. Fourteenth Claim for Relief

(Failure to Prepare an Adequate Cost Estimate for Closure)

185. The allegations in Paragraphs 1 through 36 and 124 through 184 are realleged and incorporated herein by reference.

186. Pursuant to F.A.C. Rule 62-730.180(1) (40 C.F.R. § 264.140(a)), each owner or operator is required to meet the requirements of F.A.C. Rule 62-730.180(1) (40 C.F.R. § 264.142) (Cost Estimate for Closure).

187. Pursuant to F.A.C. Rule 62-730.180(1) (40 C.F.R. § 264.142(a)), each owner or operator must have a detailed written estimate, in current dollars, of the cost of closing the facility in accordance with the requirements in 40 C.F.R. §§ 264.111 through 264.115 and the other applicable closure requirements listed in 40 C.F.R. § 264.142(a).

188. Since at least the December 8, 2003 CEI, March 1, 2005 CEI, and May 10-11, 2005 SI, and continuing through at least the date of the filing of this Complaint, the Defendant had not prepared an adequate cost estimate for closure of its hazardous waste units (phosphogypsum stack system) at its Riverview Facility in violation of the requirements 40 C.F.R. §§ 264.111 through 264.115, and the other applicable closure requirements listed in F.A.C. Rule 62-730.180(1) (40 C.F.R. § 264.142(a)).

189. Defendant is liable for injunctive relief and civil penalties pursuant to Section 3008(a) of RCRA, 42 U.S.C. § 6928(a), and the § 403.727, F.S. for each day that it failed to prepare an adequate cost estimate for the closure of its Riverview Facility phosphogypsum stack system.

xv. Fifteenth Claim for Relief

(Failure to Establish Adequate Financial Assurance for Closure)

190. The allegations in Paragraphs 1 through 36 and 124 through 189 are realleged and incorporated herein by reference.

191. Pursuant to F.A.C. Rule 62-730.180(1) (40 C.F.R. § 264.140(a)), each owner or operator of a treatment, storage and disposal facility must establish financial assurance for closure of the facility (Financial Assurance for Closure).

192. Pursuant to F.A.C. Rule 62-730.180(1) (40 C.F.R. § 264.143(a)), the owner or operator must choose from the options set forth at 40 C.F.R. § 264.143(a) through (f).

193. Since at least the December 8, 2003 CEI, March 1, 2005 CEI, and May 10-11, 2005 SI, and continuing through the date of the filing of this Complaint, Defendant had not established adequate financial assurance for closure of its phosphogypsum stack system at the Riverview Facility in violation of F.A.C. Rule 62-730.180(1) (40 C.F.R. § 264.143(a) through (f)).

194. Defendant is liable for injunctive relief and civil penalties pursuant to Section 3008(a) of RCRA, 42 U.S.C. § 6928(a), and the § 403.727, F.S. for each day that it failed to establish adequate financial assurance for closure of its Riverview Facility phosphogypsum stack system.

xvi. Sixteenth Claim for Relief

(Failure to Prepare an Adequate Cost Estimate for Post-Closure Care)

195. The allegations in Paragraphs 1 through 36 and 124 through 194 are realleged and incorporated herein by reference.

196. Pursuant to F.A.C. Rule 62-730.180(1) (40 C.F.R. 40 C.F.R. § 264.140(b)), each owner or operator of disposal facilities, piles, surface impoundments, tank systems and containment buildings must prepare a cost estimate for post-closure care of its facility to meet the requirements of F.A.C. Rule 62-730.180(1) (40 C.F.R. § 264.144) (Cost Estimate for Post-Closure Care).

197. Pursuant to F.A.C. Rule 62-730.180(1) (40 C.F.R. § 264.144(a)), the owner or operator of a disposal surface impoundment required under 40 C.F.R. § 264.228 to prepare a contingent closure and post-closure plan, must have a detailed written estimate, in current dollars, of the annual cost of post-closure monitoring and maintenance of the facility in accordance with 40 C.F.R. §§ 264.117 through 264.120, and 40 C.F.R. § 264.228.

198. Since at least the December 8, 2003 CEI, March 1, 2005 CEI, and May 10-11, 2005 SI, and continuing through at least the date of the filing of this Complaint, Defendant did not have an adequate detailed written estimate, in current dollars, of the annual cost for post-closure monitoring and maintenance of its Riverview Facility phosphogypsum stack system in accordance with the applicable post-closure regulations set forth at 40 C.F.R. §§ 264.117 through 264.120, and 40 C.F.R. § 264.228.

199. Defendant is liable for injunctive relief and civil penalties pursuant to Section 3008(a) of RCRA, 42 U.S.C. § 6928(a), and § 403.727, F.S. for each day that it failed to prepare an adequate post-closure care cost estimate for its Riverview Facility phosphogypsum stack system.

xvii. Seventeenth Claim for Relief

(Failure to Establish Adequate Financial Assurance for Post-Closure Care)

200. The allegations in Paragraphs 1 through 36 and 124 through 199 are realleged and incorporated herein by reference.

201. Pursuant to F.A.C. Rule 62-730.180(1) (40 C.F.R. § 264.140(b)) each owner or operator of disposal facilities, piles, surface impoundments, tank systems and containment buildings are required to meet the requirements of F.A.C. Rule 62-730.180(1) (40 C.F.R. § 264.145) and F.A.C. Rule 62-730.226 (Financial Assurance for Post-Closure Care).

202. Pursuant to F.A.C. Rule 62-730.180(1) (40 C.F.R. § 264.145), the owner or operator of a hazardous waste unit subject to the requirements of 40 C.F.R. § 264.144 must establish financial assurance for post-closure care in accordance with the approved post-closure plan for its facility 60 days prior to the initial receipt of hazardous waste or the effective date of the regulation, whichever is later.

203. Since at least the December 8, 2003 CEI, March 1, 2005 CEI, and May 10-11, 2005 SI, and continuing through the date of the filing of this Complaint, Defendant was subject to the requirements of F.A.C. Rule 62-730.180(1) (40 C.F.R. § 264.145(a)) and had not established adequate financial assurance for post-closure care.

204. Defendant is liable for injunctive relief and civil penalties pursuant to Section 3008(a) of RCRA, 42 U.S.C. § 6928(a), and § 403.727, F.S. for each day that it failed to establish adequate financial assurance for post-closure for its Riverview Facility phosphogypsum stack system.

xviii. Eighteenth Claim for Relief

(Failure to Establish Adequate Financial Assurance for Third Party Liability)

205. The allegations in Paragraphs 1 through 36 and 124 through 204 are realleged and incorporated herein by reference.

206. Owners and operators of treatment, storage and disposal facilities are required by F.A.C. Rule 62-730.180(1) (40 C.F.R. § 264.140(a)), to meet the requirements of 40 C.F.R. § 264.147(a) and F.A.C. Rule 62-730.226, F.A.C. (Liability Requirements).

207. Pursuant to F.A.C. Rule 62-730.180(1) (40 C.F.R. § 264.147(a)), the owner or operator of each treatment, storage and disposal facility must establish financial responsibility for bodily injury and property damage to third parties caused by sudden accidental occurrences arising from operations of the facility, and must choose from the options as specified in paragraphs (a) (1) through (6) of 40 C.F.R. § 264.147.

208. Owners and operators of surface impoundments, landfills, land treatment facilities, or hazardous waste disposal miscellaneous units are required by F.A.C. Rule 62-730.180(1) (40 C.F.R. § 264.140(a)), to meet the requirements of 40 C.F.R. § 264.147(b) and F.A.C. Rule 62-730.226 (Liability Requirements).

209. F.A.C. Rule 62-730.180(1) (40 C.F.R. § 264.147(b)) requires that the owner or operator of each surface impoundment, landfill, land treatment facility, or hazardous waste disposal miscellaneous unit establish financial responsibility for bodily injury and property damage to third parties caused by non-sudden accidental occurrences arising from operations of the facility, and must choose from the options as specified in paragraphs (b)(1) through (6) of 40 C.F.R. § 264.147.

210. Pursuant to F.A.C. Rule 62-730.180(1) (C.F.R. § 264.147(b)), owners and operators who are subject to 40 C.F.R. § 264.147(b) may combine coverage for sudden and non-sudden accidental occurrences.

211. Since at least the December 8, 2003 CEI, March 1, 2005 CEI, and May 10-11, 2005 SI, and continuing through the date of the filing of this Complaint, Defendant had not established adequate financial responsibility for third party liability for sudden or non-sudden accidental occurrences using any of the options specified in paragraphs (a)(1) through (6) or (b)(1) through (6) of 40 C.F.R. § 264.147.

212. Defendant is liable for injunctive relief and civil penalties pursuant to Section 3008(a) of RCRA, 42 U.S.C. § 6928(a), and § 403.727, F.S. for each day that it failed to establish adequate financial responsibility for third party liability at its Riverview Facility. Such failure is in violation of F.A.C. Rule 62-730.180(1) (40 C.F.R. § 264.147).

C. GENERAL BARTOW FACILITY ALLEGATIONS

Facility Process Description

213. The Bartow Facility is a production facility for sulfuric acid, phosphoric acid, FSA, MAP and DAP.

214. The Bartow Facility operates a Reverse Osmosis (RO) Unit for the treatment of process wastewater to produce clean, discharge-quality water.

215. The Bartow Facility began operations in 1929 at the current approximate 8,500 acre site as a phosphate rock storage, drying, and shipping facility associated with an adjacent phosphate mine. Cargill Fertilizer, Inc., a predecessor in interest to Cargill Fertilizer, LLC, purchased the Facility from Seminole Fertilizer Corporation in 1993. On October 22, 2004, concurrent with the merger of the Cargill fertilizer business with IMC Global, the name of Cargill Fertilizer, LLC was changed to Mosaic Fertilizer, LLC. Mosaic Fertilizer, LLC is the 100% owner of the Bartow Facility.

216. At the Bartow Facility, sulfuric acid is reacted with mineral phosphate rock to produce phosphoric acid (mineral processing). Different concentrations of phosphoric acid are then reacted with ammonia to produce MAP or DAP (chemical manufacturing).

217. Fluoride vapors emitted during the phosphoric acid evaporation steps are captured, condensed, and concentrated to produce FSA (chemical manufacturing).

218. Some process wastewater is treated at the Bartow Facility through the use of an RO system. Any unclean discharge (reject), if hazardous, from the RO system is not a mineral processing waste and is not subject to the Bevill Exclusion.

219. Operations at the Bartow Facility fall into several categories, only some of which are mineral processing.

220. On March 7-10, 2006, EPA conducted a CEI and SI at the Bartow Facility to determine the facility's compliance with state and federal RCRA requirements.

Sulfuric Acid Production

221. The manufacturing of phosphoric acid, FSA, MAP, and DAP at the Bartow Facility begins with the production of sulfuric acid. The Bartow Facility produces sulfuric acid in three (3) Sulfuric Acid Plants on-site. The sulfuric acid is stored in large tanks until piped to the Phosphoric Acid Plant's two reactors for use in digesting the phosphate rock to produce phosphoric acid.

222. Sulfuric acid is also used to clean production and storage equipment, mainly evaporators and pipes.

223. Sulfuric acid production is not a mineral processing activity and is not subject to the Bevill Exclusion.

Phosphoric Acid Production

224. Phosphate rock is received from the Defendant's mines by truck or rail car.

225. Sulfuric acid is piped from the storage tanks in the Sulfuric Acid Plants to two phosphoric acid reactors within a single Phosphoric Acid Plant (designated as the Prayon Reactor V and the Prayon Reactor U). In the reactors, the sulfuric acid is mixed with phosphate rock to produce weak phosphoric acid [approximately 30% phosphorus pentoxide (P_2O_5) (hereafter referred to as weak phosphoric acid)]. A by-product of the reaction is calcium sulfate dihydrate which is typically referred to as phosphogypsum. Phosphogypsum is separated from the weak phosphoric acid by filtration. To recover additional weak phosphoric acid, the filtered phosphogypsum is rinsed with process wastewater that is pumped from the ponds and ditches circling the phosphogypsum stack. After rinsing with process wastewater, the rinsed

phosphogypsum is mixed with process wastewater (slurried) and pumped to the 420-acre 60 mil HDPE lined phosphogypsum stack for disposal.

226. To meet material specifications for phosphate fertilizer production, Bartow concentrates the 30% phosphoric acid in two stages. The first concentration step is achieved through evaporation, resulting in 40% phosphoric acid. The 40% phosphoric acid is ultimately concentrated to 54% phosphoric acid through a second evaporation step. A blend of the 30% phosphoric acid and the 54% phosphoric acid is used in the MAP and DAP production processes.

227. Phosphoric acid production processes leading up to the manufacture of MGA are mineral processing.

228. The diversion of phosphoric acid from MGA production for use in chemical manufacturing (FSA, MAP, DAP) is not mineral processing.

229. Contaminants are accumulated in the water used throughout production of up to MGA, resulting in aqueous wastes referred to as "process wastewater." Prior to reuse in the various processes, the process wastewater must be cooled and excess contaminants must be removed. A majority of the excess contaminants precipitate from the water as it cools in the phosphogypsum stack system. Approximately 50,000-60,000 gpm of process wastewater is sent from the phosphoric acid production plant to the phosphogypsum stack system for cooling and contaminant settling.

Fertilizer Production

230. MAP and DAP fertilizer products are manufactured at the Bartow Facility in two (2) Plants designated as MAP/DAP #3 and MAP/DAP #4 (collectively referred to as the Fertilizer Plants).

231. DAP production consists of reacting a mixture of 30% phosphoric acid and 54% phosphoric acid with anhydrous ammonia in a pre-neutralizer. The resultant slurry is removed from the pre-neutralizer and pumped into a rotating drum granulator, where the product forms into round, solid, pebble-like granules. This solid material then passes through a dryer followed by a system of sizing screens and mills to achieve the desired granule size. The product is then cooled and stored. It is shipped off-site as bulk granular fertilizer for blending and use on farm crops.

232. During the production of phosphoric acid up to MGA, an impure phosphoric acid with high solids is generated. This high solids phosphoric acid is reacted with ammonia in a spray tower to produce MAP. The resultant product is dried and ground.

233. Mosaic's Fertilizer Plants' production operations are chemical manufacturing, not mineral processing and as such are not subject to the Beville Exclusion.

Air Pollution Control Devices (Phosphoric Acid and Fertilizer Production)

234. Air particulates emitted from the phosphoric acid production process are captured ("scrubbed") from the reactors, filters, and other production equipment (e.g. clarifiers and storage tanks) using scrubbers. The scrubbing liquid for scrubbers at the Bartow Facility is process wastewater that is pumped from the phosphogypsum stack system through the scrubbers to collect particulate air emissions in a single pass through the scrubber before being discharged back into the phosphogypsum stack system.

235. Most of the ammonia and fugitive air particulates emitted from the pre-neutralizer, granulator, cooler, dryer, etc., during MAP and DAP production are captured in a series of scrubbers similar to the phosphoric acid scrubbers described above. The Bartow Facility uses water from a separate pond dedicated to MAP/DAP production (pH greater than 2) to scrub air

particulates from all of the Fertilizer Plants' scrubbers except for the MAP/DAP #3 Cooler Scrubber. The MAP/DAP #3 Cooler Scrubber uses once-through process wastewater from the phosphogypsum stack system to collect these particulate air emissions. At the Bartow Facility, the process wastewater effluent from all of the scrubbers except for the MAP/DAP #3 Cooler Scrubber is pumped back to a common sump and then from the sump to the dedicated DAP Pond. Process wastewater effluent from the MAP/DAP #3 Cooler Scrubber is returned to the phosphogypsum stack system cooling pond system.

236. The operation of scrubbers is not part of mineral processing, and the wastewater from these scrubbers are not subject to the Bevill Exclusion.

FSA Production

237. The Bartow Facility produces FSA depending on market conditions.

238. FSA is produced from the vapors emitted during the first and second stage evaporation of phosphoric acid. In the first stage, each evaporator is equipped with a FSA recovery unit, also called a "Swift Tower." The gas is condensed in the Swift Tower and continuously strengthened until the desired strength of FSA is obtained, typically a 24% to 25% solution.

239. Solutions meeting customer specifications in the receiving tank are transferred to storage tanks and sold to customers off-site.

240. At the time of the March 7-10, 2006, CEI and SI, and continuing through the date of the filing of this Complaint, Mosaic discharged FSA solutions not meeting customer specifications to the process wastewater system.

241. FSA production is not a mineral processing activity and as such FSA solutions not meeting customer specifications are not subject to the Bevill Exclusion.

Pipe and Tank Cleaning

242. Mosaic cleans its pipes, tanks, evaporators, and other process equipment throughout the phosphoric acid and fertilizer production areas on a regular basis, using process wastewater, phosphogypsum stack system wastewater, or a mixture of either of these with sulfuric acid, as the cleaning agent. After use, the spent corrosive hazardous cleaning agent is discharged to the phosphogypsum stack system. Cleaning wastes are generated on a daily basis during normal plant operations and during scheduled maintenance periods.

243. Pipe and tank cleaning operations are not part of mineral processing and the wastewater from such cleaning operations are not subject to the Bevill Exclusion.

Reverse Osmosis System for Water Treatment

244. In order to meet its NPDES permit limitations when discharging water, the Bartow Facility operates a RO system to treat its process wastewater prior to discharge. The RO system has five trains and is capable of processing 1.4 million gallons of process wastewater per day. The process wastewater is pumped into the RO system from the phosphogypsum stack system for treatment. Treatment produces clean water ("permeate") and a more concentrated unclean water (reject).

245. The permeate may be discharged to local water bodies under FDEP NPDES Permit Number FL0001589.

246. The reject that exits the RO system is discharged back into the phosphogypsum stack system.

247. RO system operation is not part of mineral processing. The reject and any cleaning waste generated at the RO system are not subject to the Bevill Exclusion.

Spills & Leaks of Phosphoric Acid, FSA and Sulfuric Acid

248. In Mosaic's phosphoric acid and fertilizer production areas, spills and leaks of FSA, phosphoric acid and sulfuric acid occur. These spills and leaks commingle with process wastewater being transported from the production areas to the phosphogypsum stack system.

249. Spills and leaks of FSA, phosphoric acid and sulfuric acid are not part of mineral processing and are therefore not subject to the Beyill Exclusion.

Phosphogypsum Stack System

250. The Bartow Facility currently disposes of slurried phosphogypsum in the south phosphogypsum stack expansion, a 575-acre, 60 mil HDPE- lined phosphogypsum stack located southeast of the facility, across US Hwy 60. When originally constructed, the base of the south phosphogypsum stack did not have a liner; however, beginning in 2000, the south phosphogypsum stack was expanded vertically and a liner was placed on top of the phosphogypsum stack as the Bartow Facility expanded the phosphogypsum stack in three phases. The combined expansion phases are referred to as the south phosphogypsum stack expansion. Phosphogypsum is now deposited on top of the liners. The combined lined phosphogypsum stack operates in conjunction with a 75-acre process wastewater system, and together are referred to as the south phosphogypsum stack system.

251. The Bartow Facility's process wastewater system encompasses 325 acres, 250 acres of which are associated with the closed north phosphogypsum stack, and 75 acres which are associated with the south phosphogypsum stack expansion. Process wastewater enters the process wastewater system on the western portion of the north phosphogypsum stack and flows clockwise around the north phosphogypsum stack before being returned to the plant for use. The eastern and southern portions of the north phosphogypsum stack system have a soil-bentonite

cut-off wall keyed into the clay upper confining layer between the surficial aquifer and the artesian drinking water aquifer.

252. The process wastewater recirculation system, perimeter dikes, and miscellaneous ditches associated with the south phosphogypsum stack/south phosphogypsum stack expansion occupy approximately 75 acres. This system primarily receives leachate and runoff from the south phosphogypsum stack/south phosphogypsum stack expansion.

253. Mosaic operates the north phosphogypsum stack system and the south phosphogypsum stack system under an Industrial Wastewater Facility Permit issued by FDEP.

254. Mosaic's entire Bartow Facility is encompassed by a comprehensive groundwater monitoring system that is monitored and operated in accordance with an approved groundwater monitoring plan under Industrial Wastewater Facility Permit Numbers FL0001589 and FL0267911 issued by FDEP.

255. In 1998, Florida enacted § 403.4155, F.S., which required FDEP to promulgate rules related to closure and financial responsibility for phosphogypsum stacks. Rules were duly promulgated in Chapter 62-673, F.A.C. As a result, the Bartow Facility is required to annually estimate the cost for closing the phosphogypsum stack system (including water treatment and management costs) at the end of the useful life of the facility and the cost associated with long-term monitoring of the effectiveness of closure (post-closure care or long-term care). Based on the estimated cost for closure and long-term care, the Bartow Facility is required to establish financial assurance to guarantee the funds are available to close the facility at the end of its useful life. To meet its financial assurance obligations under Chapter 62-673.640, F.A.C., the Bartow Facility established a corporate guarantee with FDEP.

BARTOW FACILITY CLAIMS FOR RELIEF

xix. Nineteenth Claim for Relief

(Failure to Make Hazardous Waste Determinations)

256. The allegations in Paragraphs 1 through 36 and 213 through 255 are realleged and incorporated herein by reference.

257. Pursuant to F.A.C. Rule 62-730.160(1) (40 C.F.R. § 262.11), Defendant, as a generator of solid waste, is required to make a hazardous waste determination.

258. At the time of the March 7 – 10, 2006 CEI and SI, Defendant routinely generated the following solid wastes for which hazardous waste determinations had not been made:

- a. Phosphoric Acid Plant scrubbers' effluent;
- b. MAP/DAP #3 cooler scrubber effluent;
- c. FSA not meeting customer specifications (wastewater);
- d. RO reject;
- e. Spent sulfuric acid and wastewaters generated from the cleaning of phosphoric acid production pipes and equipment;
- f. Wastewaters generated from cleaning the Fertilizer Plants' and FSA production pipes and equipment; and
- g. Spills and leaks from phosphoric acid and fertilizer production.

259. Based on EPA's knowledge of the processes at the Bartow Facility and the March 7-10, 2006 CEI and SI, EPA determined the following solid wastes are D002 hazardous wastes:

- a. Phosphoric Acid Plant scrubbers' effluent;
- b. MAP/DAP #3 cooler scrubber effluent;
- c. FSA not meeting customer specifications (wastewater);

- d. RO reject;
- e. Spent sulfuric acid wastewaters generated from the cleaning of phosphoric acid production pipes and equipment;
- f. Wastewaters generated from the cleaning of Fertilizer Plants' and FSA production pipes and equipment; and
- g. Spills and leaks from phosphoric acid and fertilizer production.

260. Defendant is liable for injunctive relief and civil penalties pursuant to Section 3008(a) of RCRA, 42 U.S.C. § 6928(a), and § 403.727, F.S., for each day that it failed to make hazardous waste determinations for solid wastes generated at its Bartow Facility as required by F.A.C. Rule 62-730.160(1) (40 C.F.R. § 262.11).

xx. **Twentieth Claim for Relief**

(Treatment, Storage and Disposal of Hazardous Waste in the South Phosphogypsum Stack and the North Phosphogypsum Stack System without a Permit or Interim Status in Violation of § 403.722 F.S. ((Section 3005 of RCRA, 42 U.S.C. § 6925) and the applicable regulatory requirements found at F.A.C. Rules 62-730.180 and 62-730.220 (40 C.F.R. Part 264, Subparts A-G, K and CC, and Part 270)).

261. The allegations in Paragraphs 1 through 36 and 213 through 260 are realleged and incorporated herein by reference.

262. Section 403.722 F.S. (RCRA Section 3005(a), 42 U.S.C. § 6925(a)), and F.A.C. Rule 62-730.180 (40 C.F.R. Parts 264, Subparts A-G, K and CC, and 270), require, among other things, that the owner and operator of a hazardous waste management unit must have a permit or interim status for the treatment, storage and/or disposal of any hazardous waste during the active life of the unit.

263. Since at least March 2006 and continuing to at least the date of the filing of this Complaint, Defendant has routinely treated, stored and disposed of the following D002

hazardous wastes in its south phosphogypsum stack system and its north phosphogypsum stack system at the Bartow Facility:

- a. Phosphoric Acid Plant scrubbers' effluent;
- b. FSA not meeting customer specifications (wastewater);
- c. RO reject;
- d. Spent sulfuric acid wastewaters generated from the cleaning of phosphoric acid production pipes and equipment;
- e. Wastewaters generated from the cleaning of Fertilizer Plants' and FSA production pipes and equipment; and
- f. Spills and leaks from phosphoric acid and fertilizer production.

264. Since at least March 2006 and continuing to at least December 2009, Defendant routinely treated, stored and disposed of scrubber effluent from the MAP/DAP #3 Cooler Scrubber, a D002 hazardous waste in its south phosphogypsum stack system and its north phosphogypsum stack system at the Bartow Facility.

265. Defendant neither has a RCRA hazardous waste permit nor interim status for treatment, storage or disposal of hazardous waste in its south phosphogypsum stack system and its north phosphogypsum stack system at the Bartow Facility, and is therefore in violation of § 403.722, F.S. (Section 3005 of RCRA, 42 U.S.C. § 6925) and the applicable regulatory requirements of F.A.C. Rules 62-730.180 and 62.730.220 (40 C.F.R. Parts 264, Subparts A-G, K and CC, and 270).

266. Defendant is liable for injunctive relief and civil penalties pursuant to Section 3008(a) of RCRA, 42 U.S.C. § 6928(a), and § 403.727, F.S.F.S. for each day that it treated, stored, and/or

disposed of hazardous waste in its south phosphogypsum stack system and its north phosphogypsum stack system at its Bartow Facility without a permit or interim status.

xxi. Twenty-First Claim for Relief

(Failure to Perform Land Disposal Determinations)

267. The allegations in Paragraphs 1 through 36 and 213 through 266 are realleged and incorporated herein by reference.

268. Pursuant to F.A.C. Rule 62-730.183 (40 C.F.R. § 268.7(a)(1)), Defendant is required, among other things, to determine if its hazardous waste needs to be treated before it can be land disposed.

269. Since at least March 2006 and continuing to at least the date of filing of this Complaint, Defendant has routinely generated the following D002 hazardous wastes and failed to determine whether these wastes must be treated before they can be land disposed:

- a. Phosphoric Acid Plant scrubbers' effluent;
- b. FSA not meeting customer specifications (wastewater);
- c. RO reject;
- d. Spent sulfuric acid and wastewaters generated from the cleaning of phosphoric acid production pipes and equipment;
- e. Wastewaters generated from cleaning the Fertilizer Plants' and FSA production pipes and equipment; and
- f. Spills and leaks from phosphoric acid and fertilizer production.

270. Since at least March 2006 and continuing to at least December 2009, Defendant routinely generated MAP/DAP #3 cooler scrubber effluent, a D002 hazardous waste and failed to determine whether this waste must be treated before it can be land disposed.

271. Defendant has violated F.A.C. Rule 62-730.183 (40 C.F.R. § 268.7(a)(1)), for failure to make a hazardous waste determination before land disposal.

272. Defendant is liable for injunctive relief and civil penalties pursuant to Section 3008(a) of RCRA, 42 U.S.C. § 6928(a), and § 403.72, F.S. for each day that it failed to determine whether these hazardous wastes generated at its Bartow Facility must be treated before they can be land disposed.

xxii. Twenty-Second Claim for Relief

(Failure to Meet Land Disposal Restrictions for Prohibited Hazardous Wastes)

273. The allegations in Paragraphs 1 through 36 and 213 through 272 are realleged and incorporated herein by reference.

274. Pursuant to F.A.C. Rule 62-730.183 (40 C.F.R. § 268.9(c)), Defendant, among other things, is prohibited from land disposing a waste that exhibits a characteristic under F.A.C. Rule 62-730.030(1) (40 C.F.R. Part 261, Subpart C), unless the waste complies with the treatment standards under F.A.C. Rule 62-730.183 (Subpart D of 40 C.F.R. Part 268).

275. Pursuant to F.A.C. Rule 62-730.183 (40 C.F.R. Part 268, Subpart D), D002 corrosive wastewaters must meet the DEACT code before the waste can be land disposed.

276. Since at least March 2006 and continuing to at least the date of filing of this Complaint, the Bartow Facility routinely land disposed of the following hazardous wastes in the phosphogypsum stack system that did not meet the DEACT standard for D002 prior to land disposal:

- a. Phosphoric acid plants' scrubber effluents;
- b. FSA not meeting customer specifications (wastewater);
- c. RO reject;

- d. Spent sulfuric acid and wastewaters generated from the cleaning of phosphoric acid production pipes and equipment;
- e. Wastewaters generated from cleaning the Fertilizer Plants' and FSA production pipes and equipment; and
- f. Spills and from phosphoric acid and fertilizer production.

277. Since at least 2006 and continuing to at least December 2009, Defendant routinely disposed of MAP/DAP #3 cooler scrubber effluent, a D002 (corrosive) hazardous waste, in the phosphogypsum stack system that did not meet the DEACT standard for D002 (corrosivity) prior to land disposal.

278. Defendant is liable for injunctive relief and civil penalties pursuant to Section 3008(a) of RCRA, 42 U.S.C. § 6928(a), and § 403.727, F.S., for each day that it failed to meet the standards set forth at F.A.C. Rule 62-730.183 (40 C.F.R. §§ 268.40(a)), prior to land disposing prohibited waste in its South phosphogypsum stack system and its North phosphogypsum stack system at the Bartow Facility, in violation of F.A.C. Rule 62-730.183 (40 C.F.R. §§ 268.9(c) and 268.40(a)).

xxiii. Twenty-Third Claim for Relief

(Failure to Prepare an Adequate Cost Estimate for Closure)

279. The allegations in Paragraphs 1 through 36 and 213 through 278 are realleged and incorporated herein by reference.

280. Pursuant to F.A.C. Rule 62-730.180(1) (40 C.F.R. § 264.140(a)), each owner or operator is required to meet the requirements of F.A.C. Rule 62-730.180(1) (40 C.F.R. §264.142) (Cost Estimate for Closure).

281. Pursuant to F.A.C. Rule 62-730.180(1) (40 C.F.R. § 264.142(a)), each owner or operator must have a detailed written estimate, in current dollars, of the cost of closing the facility in accordance with the requirements in 40 C.F.R. §§ 264.111 through 264.115 and the other applicable closure requirements listed in 40 C.F.R. § 264.142(a).

282. Since at least the March 7 – 10, 2006 CEI and SI, and continuing through at least the date of the filing of this Complaint, the Defendant had not prepared an adequate cost estimate for closure of its hazardous waste units (phosphogypsum stack systems) at its Bartow Facility in violation of the requirements of F.A.C. Rule 62-703.180(1) (40 C.F.R. §§ 264.111 through 264.115), and the other applicable closure requirements listed in F.A.C. Rule 62-730.180(1) (40 C.F.R. § 264.142(a)).

283. Defendant is liable for injunctive relief and civil penalties pursuant to Section 3008(a) of RCRA, 42 U.S.C. § 6928(a), and the § 403.727, F.S. for each day that it failed to prepare an adequate cost estimate for the closure of its phosphogypsum stack systems at the Bartow Facility.

xxiv. Twenty-Fourth Claim for Relief

(Failure to Establish Adequate Financial Assurance for Closure)

292. The allegations in Paragraphs 1 through 36, and 213 through 291 are realleged and incorporated herein by reference.

293. Pursuant to F.A.C. Rule 62-730.180(1) (40 C.F.R. § 264.140(a)), each owner or operator of a treatment, storage and disposal facility must establish financial assurance for closure of the facility (Financial Assurance for Closure).

294. Pursuant to F.A.C. Rule 62-730.180(1) (40 C.F.R. § 264.143(a)), the owner or operator must choose from the options set forth at 40 C.F.R. § 264.143(a) through (f).

295. Since at least the March 7 – 10, 2006 CEI and SI, and continuing through the date of the filing of this Complaint, Defendant had not established adequate financial assurance for closure of its phosphogypsum stack systems at the Bartow Facility in violation of F.A.C. Rule 62-730.180(1) (40 C.F.R. § 264.143(a) through (f)).

296. Defendant is liable for injunctive relief and civil penalties pursuant to Section 3008(a) of RCRA, 42 U.S.C. § 6928(a), and the § 403.727, F.S. for each day that it failed to establish adequate financial assurance for closure of its phosphogypsum stack systems at the Bartow Facility.

xxv. Twenty-Fifth Claim for Relief

(Failure to Prepare an Adequate Cost Estimate for Post-Closure Care)

297. The allegations in Paragraphs 1 through 36 and 213 through 296 are realleged and incorporated herein by reference.

298. Pursuant to F.A.C. Rule 62-730.180(1) (40 C.F.R. § 264.140(b)), each owner or operator of disposal facilities, piles, surface impoundments, tank systems and containment buildings must prepare a cost estimate for post-closure care of its facility to meet the requirements of F.A.C. Rule 62-730.180(1) (40 C.F.R. § 264.144) (Cost Estimate for Post-Closure Care).

299. Pursuant to F.A.C. Rule 62-730.180(1) (40 C.F.R. § 264.144(a)), the owner or operator of a disposal surface impoundment required under 40 C.F.R. § 264.228 to prepare a contingent closure and post-closure plan, must have a detailed written estimate, in current dollars, of the annual cost of post-closure monitoring and maintenance of the facility in accordance with F.A.C. Rule 62-730.180(1) (40 C.F.R. §§ 264.117 through 264.120, and 40 C.F.R. § 264.288).

300. Since at least the March 7 – 10, 2006 CEI and SI, and continuing through at least the date of the filing of this Complaint, Defendant did not have an adequate detailed written estimate, in

current dollars, of the annual cost for post-closure monitoring and maintenance of its phosphogypsum stack systems in accordance with the applicable post-closure regulations set forth at F.A.C. Rule 62-730.180(1) (40 C.F.R. §§ 264.117 through 264.120, and 40 C.F.R. § 264.228).

301. Defendant is liable for injunctive relief and civil penalties pursuant to Section 3008(a) of RCRA, 42 U.S.C. § 6928(a), and the § 403.727, F.S. for each day that it failed to prepare an adequate post-closure care cost estimate for its phosphogypsum stack systems at the Bartow Facility.

xxvi. Twenty-Sixth Claim for Relief

(Failure to Establish Adequate Financial Assurance for Post-Closure Care)

302. The allegations in Paragraphs 1 through 36 and 213 through 301 are realleged and incorporated herein by reference.

303. Pursuant to F.A.C. Rule 62-730.180(1) (40 C.F.R. § 264.140(b)) each owner or operator of disposal facilities, piles, surface impoundments, tank systems, and containment buildings are required to meet the requirements of F.A.C. Rule 62-730.180(1) (40 C.F.R. § 264.145) (Financial Assurance for Post-Closure Care).

304. Pursuant to F.A.C. Rule 62-730.180(1) (40 C.F.R. § 264.145), the owner or operator of a hazardous waste unit subject to the requirements of 40 C.F.R. § 264.144 must establish financial assurance for post-closure care in accordance with the approved post-closure plan for its facility 60 days prior to the initial receipt of hazardous waste or the effective date of the regulation, whichever is later.

305. Since at least the March 7 – 10, 2006 CEI and SI, and continuing through the date of the filing of this Complaint, Defendant was subject to the requirements of F.A.C. Rule 62-

730.180(1) (40 C.F.R. § 264.145(a)) and had not established adequate financial assurance for post-closure care.

306. Defendant is liable for injunctive relief and civil penalties pursuant to Section 3008(a) of RCRA, 42 U.S.C. § 6928(a), and § 403.727, F.S. for each day that it failed to establish adequate financial assurance for post-closure for its phosphogypsum stack systems.

xxvii. Twenty-Seventh Claim for Relief

(Failure to Establish Adequate Financial Assurance for Third Party Liability)

307. The allegations in Paragraphs 1 through 36 and 213 through 306 are realleged and incorporated herein by reference.

308. Owners and operators of treatment, storage and disposal facilities are required by F.A.C. Rule 62-730.180(1) (40 C.F.R. § 264.140(a)), to meet the requirements of F.A.C. Rule 62-730.226 (40 C.F.R. § 264.147(a)) (Liability Requirements).

309. Pursuant to F.A.C. Rule 62-730.180(1) (40 C.F.R. § 264.147(a)), the owner or operator of each treatment, storage and disposal facility must establish financial responsibility for bodily injury and property damage to third parties caused by sudden accidental occurrences arising from operations of the facility, and must choose from the options as specified in paragraphs (a) (1) through (6) of 40 C.F.R. § 264.147.

310. Owners and operators of surface impoundments, landfills, land treatment facilities, or hazardous waste disposal miscellaneous units are required by F.A.C. Rule 62-730.180(1) (40 C.F.R. § 264.140(a)), to meet the requirements of 40 C.F.R. § 264.147(b) and Rule 62-730.226, F.A.C. (Liability Requirements).

311. F.A.C. Rule 62-730.180(1) (40 C.F.R. § 264.147(b)), require that the owner or operator of each surface impoundment, landfill, land treatment facility, or hazardous waste disposal

miscellaneous unit must establish financial responsibility for bodily injury and property damage to third parties caused by non-sudden accidental occurrences arising from operations of the facility, and must choose from the options as specified in paragraphs (b)(1) through (6) of 40 C.F.R. § 264.147.

312. Pursuant to F.A.C. Rule 62-730.180(1) (40 C.F.R. § 264.147(b)), owners and operators who are subject to 40 C.F.R. § 264.147(b) may combine coverage for sudden and non-sudden accidental occurrences.

313. Since at least the March 7 – 10, 2006 CEI and SI, and continuing through the date of the filing of this Complaint, Defendant had not established adequate financial responsibility for third party liability for sudden or non-sudden accidental occurrences using any of the options specified in paragraphs (a)(1) through (6) or (b)(1) through (6) of 40 C.F.R. § 264.147.

314. Defendant is liable for injunctive relief and civil penalties pursuant to Section 3008(a) of RCRA, 42 U.S.C. § 6928(a), and § 403.727, F.S. for each day that it failed to establish adequate financial responsibility for third party liability at its Bartow Facility. Such failure is in violation of F.A.C. Rule 62-730.180(1) (40 C.F.R. § 264.147).

D. GENERAL GREEN BAY FACILITY ALLEGATIONS

Facility and Process Description

315. The Green Bay Facility was a production facility for sulfuric acid, phosphoric acid, FSA, DAP and MAP.

316. In October 2005, Defendant ceased production of DAP at the Green Bay Facility.

317. In May 2006, Defendant idled the phosphoric acid manufacturing plant and MAP production and ceased all production operations at the Green Bay facility. The Green Bay Facility is currently undergoing closure pursuant to FDEP Closure Permit Number FL0000752.

318. On March 8, 2006, EPA conducted a CEI and SI at the Green Bay Facility to determine the Facility's compliance with state and federal RCRA requirements.

319. The Green Bay Facility is approximately 2,545 acres and is located at 4390 State Road 640 West in Bartow, Florida. The Facility began operation in 1965 under the ownership of Farmland Industries, Inc. Primary operations at that time included one production line for the manufacture of phosphoric acid. In 1971, a second fertilizer production plant was constructed within the chemical complex. In November 1991, a joint venture known as Farmland Hydro Limited Partnership was formed between Norsk Hydro USA Inc. and Farmland Industries, Inc. Farmland Hydro LLP purchased an ammonia terminal and pipeline from Seminole Fertilizer Corporation. Farmland Hydro LLP manufactured sulfuric acid, phosphoric acid, DAP, and MAP. Cargill Fertilizer, Inc. purchased the facility in 2002 and continued the previous manufacturing operations. On October 22, 2004, concurrent with the merger of the Cargill fertilizer business with IMC Global, the name of Cargill Fertilizer, LLC was changed to Mosaic Fertilizer, LLC. Mosaic Fertilizer, LLC is the 100% owner of the Green Bay Facility.

320. Prior to idling all operations at the Green Bay Facility, sulfuric acid was reacted with mineral phosphate rock to produce phosphoric acid (mineral processing). Different concentrations of phosphoric acid were then reacted with ammonia to produce MAP or DAP (chemical manufacturing).

321. Fluoride vapors emitted during the phosphoric acid evaporation steps were captured, condensed, and concentrated to produce FSA (chemical manufacturing).

322. Some process wastewater is treated at the Green Bay Facility thorough the use of an RO system. Any unclean discharge (reject) from the RO system, if hazardous, is not mineral processing and is not subject to the Bevill Exclusion.

323. Operations at the Green Bay Facility fall into several categories, only some of which are mineral processing.

Sulfuric Acid Production

324. The manufacturing of phosphoric acid, FSA, and MAP (DAP was not being produced at the time of the March 8, 2006 CEI) at the Green Bay Facility began with the production of sulfuric acid. The Green Bay Facility produced sulfuric acid in three (3) Sulfuric Acid Plants on-site. The sulfuric acid was stored in large tanks until piped to the two Phosphoric Acid Plants' reactors for use in digesting the phosphate rock to produce phosphoric acid.

325. Sulfuric acid production is not a mineral processing activity and is not subject to the Bevill Exclusion.

Phosphoric Acid Production

326. Phosphate rock was received from the Defendant's mines by truck or rail car.

327. Sulfuric acid was piped from the storage tanks in the Sulfuric Acid Plants to reactors within the Phosphoric Acid Plants. In the reactors, the sulfuric acid was mixed with phosphate rock to produce weak phosphoric acid. A by-product of the reaction is calcium sulfate dihydrate, which is typically referred to as phosphogypsum. Phosphogypsum was separated from the weak phosphoric acid by filtration and rinsed with process wastewater that was pumped from the ponds and ditches circling the phosphogypsum stack. After rinsing with process wastewater to recover residual phosphoric acid, the rinsed phosphogypsum was mixed with process wastewater and pumped to the phosphogypsum stack for disposal.

328. The Green Bay Facility concentrated the weak phosphoric acid to 54% phosphoric acid through evaporation. The first concentration step usually resulted in 40% phosphoric acid. The

second concentration usually resulted in the production of 54% phosphoric acid. A blend of the weak phosphoric acid and the 54% phosphoric acid was used in MAP production.

329. Production processes leading to the manufacture of up to MGA are mineral processing.

330. The diversion of phosphoric acid from the production of MGA for use in chemical manufacturing (FSA, MAP) is not mineral processing.

331. Contaminants accumulated in the water used throughout production of phosphoric acid up to MGA, resulting in aqueous wastes referred to as "process wastewater." Prior to reuse in the various processes, the process wastewater was cooled and excess contaminants removed.

Fertilizer Production

332. MAP fertilizer products were manufactured at the facility in two (2) Plants designated as the North MAP/DAP Plant and the South MAP/DAP Plant. Only the South MAP/DAP Plant was operational during the March 8, 2006 CEI.

333. MAP was produced by reacting phosphoric acid solution produced on site with ammonia. The resultant ammoniated phosphoric acid slurry was piped from the reactor to pugmills (granulators) where the product was ground and sprayed with acid to adjust the size of the granules. The product was then sent to a drier to remove residual water. The dried granules were cooled and screened. The final product was then conveyed to a MAP/DAP storage warehouse until shipment.

334. MAP fertilizer production is chemical manufacturing and as such, is not subject to the Bevill Exclusion.

Air Pollution Control Devices (Phosphoric Acid and Fertilizer Production)

335. Air particulates emitted from the phosphoric acid production process were captured ("scrubbed") from the reactors, filters, and other production equipment (e.g. clarifiers and

storage tanks) using scrubbers. The scrubbing liquid for scrubbers at the Green Bay Facility was process wastewater that was pumped from the phosphogypsum stack system through the scrubbers to collect particulate air emissions in a single pass through the scrubber before being discharged back into the phosphogypsum stack system.

336. Most of the ammonia and fugitive air particulates emitted from the reactor, granulator, cooler, dryer, etc., during MAP production were captured in a series of scrubbers similar to the phosphoric acid scrubbers described above. The Green Bay Facility MAP scrubbers were designated as the "Cooler Scrubber," the "Dryer Scrubber," the "R/G [*Reactor/ Granulator*] Scrubber," and the "S/M [*Screens & Mills*] Scrubber." The R/G Scrubber was segregated into two components: the R/G Scrubber Acid Side, and the R/G Scrubber Water Side. In addition to the typical configuration of the aforementioned scrubbers, the South Plant was equipped with a scrubber that interrupted the gas flow from the S/M Fan and from the Dryer Fan exiting the Dryer Stack. This scrubber was referred to as the "Cross Flow Scrubber." The input for the Cross Flow Scrubber (CFS) was process wastewater and the effluent was piped to the CFS Tank. The CFS Tank also had a process wastewater input and discharged to the R/G Scrubber Water Side. The R/G Scrubber discharged to the phosphogypsum stack system via the "Hotwell Tank/Sump." The only scrubber at the South Plant that discharged to the phosphogypsum stack system [via the Hotwell Tank/Sump] was the R/G Scrubber. Although a majority of scrubber water from the Cooler Scrubber, the S/M Scrubber, and the Dryer Scrubber recirculated through a "Recycle Tank," all of the scrubbers had at least one process wastewater input which acted as either the scrubber medium or as a knock-out stream to remove additional contaminants after the gas stream left the scrubber and before it was vented to the Title V permitted stack. A portion of

all of these process wastewater streams were recirculated to the CFS Tank and were ultimately discharged to the phosphogypsum stack system.

337. The operation of air pollution control devices is not part of mineral processing and as such, the wastewaters from the scrubbers are not subject to the Bevill Exclusion.

Pipe and Tank Cleaning

338. Mosaic cleaned its pipes, tanks, evaporators, and other process equipment throughout the phosphoric acid and fertilizer production areas on a regular basis, using process wastewater, phosphogypsum stack system wastewater, or a mixture of either with sulfuric acid as the cleaning agent. After use, the spent corrosive hazardous cleaning agent was discharged to the floors of the phosphoric acid plants. The washdown waters flowed to a ditch on the south side of the Phosphoric Acid Plants. The ditch then connected to the RG Combined Sump (also called the “Hotwell Tank/Sump” in MAP South, which subsequently flowed to the phosphogypsum stack system. Cleaning wastes were generated on a daily basis during normal plant operations and during scheduled maintenance periods.

339. Pipe and tank cleaning operations are not part of mineral processing and the wastewaters from such cleaning operations are not subject to the Bevill Exclusion.

Reverse Osmosis System for Water Treatment

340. As part of its closure plan set forth in the closure permit for the Green Bay Facility and the water management plan required by Chapter 62-673 F.A.C., Mosaic included the operation of a RO system for the treatment of process wastewater through RO membranes for separation into a purified water stream (“permeate”) and a concentrated process wastewater stream (“reject”). The Green Bay Facility returns the reject stream to the phosphogypsum stack system

and discharges the permeate to the Alafia River watershed as authorized by Permit No.

FL0000752.

341. The RO system receives process wastewater inputs from the Green Bay Facility phosphogypsum stack system and from the Regional Holding Pond, which has commingled process wastewater from Defendant's Bartow, Mulberry, and Green Bay Facilities.

342. RO system operation is not part of mineral processing. The reject and any cleaning waste generated at the RO system are not subject to the Bevill Exclusion.

Phosphogypsum Stack Systems

343. The Green Bay Facility operated one unlined (closed) phosphogypsum stack and one lined phosphogypsum stack. Closure of the lined (north) phosphogypsum stack system is authorized under Permit Number FL0000752 which was issued by the FDEP on February 10, 2014 (expiring February 9, 2019). This permit incorporated applicable regulatory requirements for FDEP's wastewater program and its state authorized NPDES program under Section 402 of the Clean Water Act, 33 U.S.C.

§ 1251 et seq. Closure of the unlined (south) phosphogypsum stack is under the facility's Closure Permit Number FLA267929.

344. Mosaic's entire Green Bay Facility is encompassed by a comprehensive groundwater monitoring system that is monitored and operated in accordance with an approved groundwater monitoring plan under Industrial Wastewater Facility Permit Number FL0000752 issued by FDEP.

345. In 1998, Florida enacted § 403.4155, F.S., which required FDEP to promulgate rules related to closure and financial responsibility for phosphogypsum stacks. Rules were duly promulgated in F.A.C. Chapter 62-673. As a result, Mosaic is required to annually estimate the

cost for closing the phosphogypsum stack systems (including water treatment and management costs) at the end of the useful life of the facility and the cost associated with long-term monitoring of the effectiveness of closure (post-closure care or long-term care). Based on the estimated cost for closure and long-term care, Mosaic is required to establish Financial Assurance to guarantee the funds are available to close the facility at the end of the useful life. To meet its Financial Assurance obligations under F.A.C. Rule 62-673.640, Mosaic established a corporate guarantee with FDEP.

Spills & Leaks of Phosphoric Acid and Sulfuric Acid

346. In Mosaic's phosphoric acid and fertilizer production, spills and leaks of phosphoric acid and sulfuric acid occurred. These spills and leaks commingled with process wastewater being transported from the production areas to the phosphogypsum stack systems.

347. Spills and leaks of phosphoric acid are not part of mineral processing and are therefore not subject to the Bevill Exclusion.

GREEN BAY FACILITY CLAIMS FOR RELIEF

xxviii. Twenty-Eighth Claim for Relief

(Failure to Make Hazardous Waste Determinations)

348. The allegations in Paragraphs 1 through 36 and 315 through 347 are realleged and incorporated herein by reference.

349. Pursuant to F.A.C. Rule 62-730.160(1) (40 C.F.R. § 262.11), Defendant, as a generator of solid waste, is required to make a hazardous waste determination.

350. At the time of the March 8, 2006 Green Bay Facility CEI and SI and continuing to at least May 2006, Defendant routinely generated the following solid wastes for which hazardous waste determinations had not been made:

- a. Phosphoric Acid Plants scrubbers' effluent;
- b. South MAP/DAP plant scrubber effluent;
- c. RO reject;
- d. Spent sulfuric acid and wastewaters generated from cleaning phosphoric acid production pipes and equipment; and
- e. Spills and leaks from phosphoric acid and MAP production.

351. Based on EPA's knowledge of the processes at the Green Bay Facility and the March 8, 2006 CEI and SI, EPA determined the following solid wastes are D002 hazardous wastes:

- a. Phosphoric Acid Plants scrubbers' effluent;
- b. RO reject;
- c. Spent sulfuric acid and wastewaters generated from cleaning phosphoric acid production pipes and equipment;
- d. Wastewaters generated from cleaning the South MAP/DAP Plant production equipment; and
- e. Spills and leaks from phosphoric acid and MAP production.

352. Defendant is liable for injunctive relief and civil penalties pursuant to Section 3008(a) of RCRA, 42 U.S.C. § 6928(a), and § 403.727, F.S., for each day that it failed to make hazardous waste determinations for solid wastes generated at its Green Bay Facility as required by F.A.C. Rule 62-730.160(1) (40 C.F.R. § 262.11).

xxix. Twenty-Ninth Claim for Relief

(Treatment, Storage and Disposal of Hazardous Waste in the RG Recovery Return Sump and the Phosphogypsum Stack System Without a Permit or Interim Status in Violation of § 403.722 F.S. ((Section 3005 of RCRA, 42 U.S.C. § 6925) and the applicable regulatory requirements found at F.A.C. Rules 62-730.180 and 62-730.220 (40 C.F.R. Part 264, Subparts A-G, K and CC, and Part 270)).

353. The allegations in Paragraphs 1 through 36 and 315 through 352 are realleged and incorporated herein by reference.

354. Section 403.722 F.S. (RCRA Section 3005(a), 42 U.S.C. § 6925(a)), and F.A.C. Rule 62-730.180 (40 C.F.R. Parts 264, Subparts A-G, K and CC, and 270), require, among other things, that the owner and operator of a hazardous waste management unit must have a permit or interim status for the treatment, storage and/or disposal of any hazardous waste during the active life of the unit.

355. Since at least March 8, 2006 and continuing to at least the date of filing of this Complaint, Defendant routinely treated, stored and disposed of the following D002 hazardous wastes in the RG Recovery Return Sump and/or the phosphogypsum stack system at the Green Bay Facility:

- a. RO reject;
- b. Phosphoric Acid Plants scrubbers' effluent;
- c. South MAP/DAP Plant's scrubbers
- d. Spent sulfuric acid and wastewaters generated from cleaning phosphoric acid production pipes and equipment; and
- e. Spills and leaks from phosphoric acid and fertilizer production.

284. Defendant neither has a RCRA hazardous waste permit nor interim status for treatment, storage or disposal of hazardous waste in its RG Recovery Sump or phosphogypsum stack

systems, and has therefore violated § 403.722, F.S. (Section 3005 of RCRA, 42 U.S.C. § 6925) and the applicable regulatory requirements of F.A.C. Rules 62-730.180 and 62.730.220 (40 C.F.R. Parts 264, Subparts A-G, K and CC, and 270).

356. Defendant is liable for injunctive relief and civil penalties pursuant to Section 3008(a) of RCRA, 42 U.S.C. § 6928(a), and § 403.727, F.S. for each day that it treated, stored, and/or disposed of hazardous waste in its RG Recovery Sump and phosphogypsum stack systems at its Green Bay Facility without a permit or interim status.

xxx. *Thirtieth Claim for Relief*

(Failure to Perform Land Disposal Determinations)

357. The allegations in Paragraphs 1 through 36 and 315 through 356 are realleged and incorporated herein by reference.

358. Pursuant to F.A.C. Rule 62-730.183 (40 C.F.R. § 268.7(a)(1)), Defendant is required, among other things, to determine if its hazardous waste needs to be treated before it can be land disposed.

359. Since at least March 8, 2006 and continuing to at least May 2006, Defendant routinely generated the following hazardous wastes and failed to determine whether these wastes must be treated before they can be land disposed:

- a. Phosphoric Acid Plants scrubbers' effluent;
- b. South MAP/DAP Plant scrubber effluent;
- c. RO reject;
- d. Spent sulfuric acid and wastewaters generated from cleaning phosphoric acid production pipes and equipment; and
- e. Spills and leaks from the production of phosphoric acid and MAP.

360. Defendant has violated F.A.C. Rule 62-730.183 (40 C.F.R. § 268.7(a)(1)), for failure to make hazardous waste determinations before land disposal.

361. Defendant is liable for injunctive relief and civil penalties pursuant to Section 3008(a) of RCRA, 42 U.S.C. § 6928(a), and § 403.72, F.S. for each day that it failed to determine whether these hazardous wastes generated at its Green Bay Facility must be treated before they can be land disposed.

xxxi. Thirty-First Claim for Relief

(Failure to Meet Land Disposal Restrictions for Prohibited Hazardous Wastes)

362. The allegations in Paragraphs 1 through 36 and 315 through 361 are realleged and incorporated herein by reference.

363. Pursuant to F.A.C. Rule 62-730.183 (40 C.F.R. § 268.9(c)), Defendant, among other things, is prohibited from land disposing a waste that exhibits a characteristic under F.A.C. Rule 62-730.030 (Subpart C of 40 C.F.R. Part 261), unless the waste complies with the treatment standards under F.A.C. Rule 62-730.183 (Subpart D of 40 C.F.R. Part 268).

364. Pursuant to F.A.C. Rule 62-730.183 (40 C.F.R. Part 268, Subpart D), D002 corrosive wastewaters, must meet the DEACT treatment standard before the waste can be disposed.

365. Pursuant to F.A.C. Rule 62-730.183 (Subpart D of 40 C.F.R. Part 268), the “Universal Treatment Standards” regulations, require, among other things, that prohibited wastewaters must contain no more than 1.4 mg/L of arsenic to be land disposed.

366. Based on the results from the March 8, 2006 CEI and SI and EPA’s knowledge of the composition of the Mosaic Green Bay Facility’s hazardous wastes, Mosaic was land disposing the following wastes in the phosphogypsum stack system, which wastes did not meet the DEACT standard for D002 wastes prior to land disposal:

- a. Phosphoric Acid Plants scrubbers' effluent;
- b. RO reject;
- c. Spent sulfuric acid and wastewaters generated from cleaning phosphoric acid production pipes and equipment; and
- d. Spills and leaks from the production of phosphoric acid and MAP.

367. Based on the results of the March 8, 2006 CEI and SI and EPA's knowledge of the composition of the Mosaic Green Bay Facility's hazardous wastes, the South MAP/DAP Plant scrubber effluent was being land disposed in the phosphogypsum stack systems and did not meet the DEACT standard for D002 (corrosivity) or the Universal Treatment Standard of 1.4 mg/L of arsenic prior to land disposal.

368. Defendant is liable for injunctive relief and civil penalties pursuant to Section 3008(a) of RCRA, 42 U.S.C. § 6928(a), and § 403.727, F.S., for each day that it failed to meet the standards set forth at F.A.C. Rule 62-730.183 (40 C.F.R. Subpart D) prior to land disposing prohibited waste in its phosphogypsum stack systems at the Green Bay Facility, is in violation of F.A.C. Rule 62-730.183 (40 C.F.R. § 268.9(c), and Subpart D).

xxxii. Thirty-Second Claim for Relief

(Failure to Prepare an Adequate Cost Estimate for Closure)

369. The allegations in Paragraphs 1 through 36 and 315 through 368 are realleged and incorporated herein by reference.

370. Pursuant to F.A.C. Rule 62-730.180(1) (40 C.F.R. § 264.140(a)), each owner or operator is required to meet the requirements of F.A.C. Rule 62-730.180(1) (40 C.F.R. § 264.142) (Cost Estimate for Closure).

371. Pursuant to F.A.C. Rule 62-730.180(1) (40 C.F.R. § 264.142(a)), each owner or operator must have a detailed written estimate, in current dollars, of the cost of closing the facility in accordance with the requirements in 40 C.F.R. §§ 264.111 through 264.115, and the other applicable closure requirements listed in 40 C.F.R. § 264.142(a).

372. Since at least the March 8, 2006 Green Bay Facility CEI and SI, and continuing through at least the date of the filing of this Complaint, Defendant had not established an adequate cost estimate for closure of its hazardous waste units (phosphogypsum stack systems) at its Green Bay Facility in violation of the requirements F.A.C. Rule 62-730.180(1) (40 C.F.R. §§ 264.111 through 264.115) and the other applicable closure requirements listed in 40 C.F.R. § 264.142(a).

373. Defendant is liable for injunctive relief and civil penalties pursuant to Section 3008(a) of RCRA, 42 U.S.C. § 6928(a), and the § 403.727, F.S. for each day that it failed to establish an adequate cost estimate for the closure of its Green Bay Facility.

xxxiii. Thirty-Third Claim for Relief

(Failure to Establish Adequate Financial Assurance for Closure)

374. The allegations in Paragraphs 1 through 36 and 315 through 373 are realleged and incorporated herein by reference.

375. Pursuant to F.A.C. Rule 62-730.180(1) (40 C.F.R. § 264.140(a)), each owner or operator of a treatment, storage and disposal facility must establish financial assurance for closure of the facility (Financial Assurance for Closure).

376. Pursuant to F.A.C. Rule 62-730.180(1) (40 C.F.R. § 264.143(a)), the owner or operator must choose from the options set forth at 40 C.F.R. § 264.143(a) through (f).

377. Since at least the March 8, 2006 Green Bay Facility CEI and SI, and continuing through at least the date of the filing of this Complaint, Defendant had not established adequate financial

assurance for closure of its Green Bay phosphogypsum stack systems in violation of F.A.C. Rule 62-730.180(1) (40 C.F.R. § 264.143(a) through (f)).

378. Defendant is liable for injunctive relief and civil penalties pursuant to Section 3008(a) of RCRA, 42 U.S.C. § 6928(a), and the § 403.727, F.S. for each day that it failed to establish adequate financial assurance for closure of its Green Bay Facility's phosphogypsum stack systems.

xxxiv. *Thirty-Fourth Claim for Relief*

(Failure to Prepare an Adequate Cost Estimate for Post-Closure Care)

379. The allegations in Paragraphs 1 through 36 and 315 through 378 are realleged and incorporated herein by reference.

380. Pursuant to F.A.C. Rule 62-730.180(1) (40 C.F.R. § 264.140(b)), each owner or operator of disposal facilities, piles, surface impoundments, tank systems and containment buildings, must prepare a cost estimate for post-closure of its facility to meet the requirements of F.A.C. Rule 62-730.180(1) (40 C.F.R. § 264.144) (Cost Estimate for Post-Closure Care).

381. Pursuant to F.A.C. Rule 62-730.180(1) (40 C.F.R. § 264.144(a)), the owner or operator of a disposal surface impoundment required under 40 C.F.R. § 264.228 to prepare a contingent closure and post-closure plan, must have a detailed written estimate, in current dollars, of the annual cost of post-closure monitoring and maintenance of the facility in accordance with F.A.C. Rule 62-730.180(1) (40 C.F.R. §§ 264.117 through 264.120, and 40 C.F.R. § 264.228.)

382. Since at least the March 8, 2006 Green Bay Facility CEI and SI, and continuing through at least the date of the filing of this Complaint, Defendant did not have an adequate detailed written estimate, in current dollars, of the annual cost for post-closure monitoring and maintenance of its Green Bay Facility's phosphogypsum stack systems in accordance with the

applicable post-closure regulations set forth at F.A.C. Rule 62-730.180(1) (40 C.F.R. §§ 264.117 through 264.120, and 40 C.F.R. § 264.228).

383. Defendant is liable for injunctive relief and civil penalties pursuant to Section 3008(a) of RCRA, 42 U.S.C. § 6928(a), and the § 403.727, F.S. for each day that it failed to prepare an adequate post-closure care cost estimate for its Green Bay Facility's phosphogypsum stack systems.

xxxv. **Thirty-Fifth Claim for Relief**

(Failure to Establish Adequate Financial Assurance for Post-Closure Care)

384. The allegations in Paragraphs 1 through 36 and 315 through 383 are realleged and incorporated herein by reference.

385. Pursuant to F.A.C. Rule 62-730.180(1) (40 C.F.R. § 264.140(b)), each owner or operator of disposal facilities, piles, surface impoundments, tank systems and containment buildings are required to meet the requirements of F.A.C. Rule 62-730.180(1) (40 C.F.R. § 264.145) (Financial Assurance for Post-Closure Care).

386. Pursuant to F.A.C. Rule 62-730.180(1) (40 C.F.R. § 264.145), the owner or operator of a hazardous waste unit subject to the requirements of 40 C.F.R. § 264.144 must establish financial assurance for post-closure care in accordance with the approved post-closure plan for its facility 60 days prior to the initial receipt of hazardous waste or the effective date of the regulation, whichever is later.

387. Since at least the March 8, 2006 Green Bay Facility CEI and SI, and continuing through the date of the filing of this Complaint, Defendant was subject to the requirement of F.A.C. Rule 62-730.180(1) (40 C.F.R. § 264.145) and had not established adequate financial assurance for post-closure care.

388. Defendant is liable for injunctive relief and civil penalties pursuant to Section 3008(a) of RCRA, 42 U.S.C. § 6928(a), and § 403.727, F.S. for each day that it failed to establish adequate financial assurance for post-closure care for its Green Bay Facility.

xxxvi. Thirty Sixth Claim for Relief

(Failure to Establish Adequate Financial Assurance for Third Party Liability)

389. The allegations in Paragraphs 1 through 36 and 315 through 389 are realleged and incorporated herein by reference.

390. Owners and operators of treatment, storage and disposal facilities are required by F.A.C. Rule 62-730.180(1) (40 C.F.R. § 264.140(a)), to meet the requirements of 40 C.F.R. § 264.147(a) and F.A.C. Rule 62-730.226, F.A.C. (Liability Requirements).

391. Pursuant to F.A.C. Rule 62-730.180(1) (40 C.F.R. § 264.147(a)), the owner or operator of each treatment, storage and disposal facility must establish financial responsibility for bodily injury and property damage to third parties caused by sudden accidental occurrences arising from operations of the facility, and must choose from the options as specified in paragraphs (a) (1) through (6) of 40 C.F.R. § 264.147.

392. Owners and operators of surface impoundments, landfills, land treatment facilities, or hazardous waste disposal miscellaneous units are required by F.A.C. Rule 62-730.180(1) (40 C.F.R. § 264.140(a)), to meet the requirements of 40 C.F.R. § 264.147(b) and F.A.C. Rule 62-730.226, F.A.C. (Liability Requirements).

393. F.A.C. Rule 62-730.180(1) (40 C.F.R. § 264.147(b)), require that the owner or operator of each surface impoundment, landfill, land treatment facility, or hazardous waste disposal miscellaneous unit must establish financial responsibility for bodily injury and property damage to third parties caused by non-sudden accidental occurrences arising from operations of the

facility, and must choose from the options as specified in paragraphs (b)(1) through (6) of 40 C.F.R. § 264.147.

394. Pursuant to F.A.C. Rule 62-730.180(1) (C.F.R. § 264.147(b)), owners and operators who are subject to 40 C.F.R. § 264.147(b) may combine coverage for sudden and non-sudden accidental occurrences.

395. Since at least the March 8, 2006 Green Bay Facility CEI and SI, and continuing through at least the date of the filing of this Complaint, Defendant had not established adequate financial responsibility for third party liability for sudden or non-sudden accidental occurrences using any of the options specified in paragraphs (a)(1) through (6) or (b)(1) through (6) of 40 C.F.R. § 264.147.

396. Defendant is liable for injunctive relief and civil penalties pursuant to Section 3008(a) of RCRA, 42 U.S.C. § 6928(a), and § 403.727, F.S. for each day that it failed to establish adequate financial responsibility for third party liability at its Green Bay Facility. Such failure is in violation of F.A.C. Rule 62-730.180(1) (40 C.F.R. § 264.147).

E. GENERAL MULBERRY FACILITY ALLEGATIONS

Facility and Process Description

397. The Mulberry Facility was a phosphoric acid and sulfuric acid production facility.

398. As of 2000, the Mulberry phosphoric acid plant was no longer operational and has since been completely demolished. The sulfuric acid plant remained operational.

399. Until 2001, the Mulberry Facility was owned by Mulberry Phosphates. Upon the bankruptcy of Mulberry Phosphates, Cargill Crop Nutrition, the predecessor to Mosaic Fertilizer, purchased the sulfuric acid production operations at the site. On October 22, 2004, concurrent

with the merger of the Cargill fertilizer business with IMC Global, the name of Cargill Fertilizer, LLC was changed to Mosaic Fertilizer, LLC.

400. On December 10 – 11, 2003, EPA conducted a CEI, and on March 9, 2006, EPA conducted a CEI and SI at the Mulberry Facility to determine the Facility's compliance with state and federal RCRA requirements.

401. In September 2008, all sulfuric acid production operations ceased and the sulfuric acid plant has since been demolished.

Sulfuric Acid Production

402. The Mulberry Facility produced sulfuric acid in one plant on-site.

403. Hazardous waste generated from the Mulberry Facility sulfuric acid plant included wastewater from regenerating the ion exchange resin within demineralizer units. The cationic exchange resin was regenerated with sulfuric acid and the anionic exchange resin was regenerated with sodium hydroxide. The Mulberry Facility discharged the sulfuric acid hazardous regeneration wastewater to a cracked concrete pad. The wastewater flowed over the concrete pad to a concrete sump that was interconnected to an earthen surface impoundment of approximately 60 feet by 30 feet. This earthen surface impoundment was also referred to as the Mosquito Pond.

404. By March 2006, the Mosquito Pond had been emptied, treated with caustic, filled with soil and provided a grass cover.

405. Sulfuric acid manufacturing and storage is not mineral processing and wastes generated from this process are not subject to the Bevill Exclusion.

MULBERRY FACILITY CLAIMS FOR RELIEF

xxxvii. Thirty-Seventh Claim for Relief

(Failure to Make Hazardous Waste Determinations)

406. The allegations in Paragraphs 1 through 36 and 397 through 405 are realleged and incorporated herein by reference.

407. Pursuant to F.A.C. Rule 62-730.160(1) (40 C.F.R. § 262.11), Defendant, as a generator of solid waste, is required to make a hazardous waste determination.

408. At the time of the December 10 -11, 2003 CEI and March 9, 2006 CEI and SI, Defendant routinely generated wastewaters from the regeneration of demineralizer units associated with sulfuric acid production for which hazardous waste determinations had not been made.

409. Based on EPA's knowledge of the processes at the Mulberry Facility and the December 10 – 11, 2003 CEI and March 9, 2006 CEI and SI, EPA determined the wastewaters from the regeneration of demineralizer units associated with sulfuric acid production were D002 hazardous wastes.

410. Defendant is liable for injunctive relief and civil penalties pursuant to Section 3008(a) of RCRA, 42 U.S.C. § 6928(a), and § 403.727, F.S., for each day that it failed to make a hazardous waste determination for solid wastes generated at its Mulberry Facility as required by F.A.C. Rule 62-730.160(1) (40 C.F.R. § 262.11).

xxxviii. Thirty-Eighth Claim for Relief

(Treatment, Storage and Disposal of Hazardous Waste at the Sulfuric Acid Plant in a Surface Impoundment Without a Permit or Interim Status in Violation of § 403.722 F.S. ((Section 3005 of RCRA, 42 U.S.C. § 6925) and the applicable regulatory requirements found at F.A.C. Rules 62-730.180 and 62-730.220 (40 C.F.R. Part 264, Subparts A-G, K and CC, and Part 270)).

411. The allegations in Paragraphs 1 through 36 and 397 through 410 are realleged and incorporated herein by reference.

412. Section 403.722, F.S. (RCRA Section 3005(a), 42 U.S.C. § 6925(a)), and F.A.C. Rule 62-730.180 (40 C.F.R. Parts 264, Subparts A-G, K and CC, and 270), require, among other things, that the owner and operator of a hazardous waste management unit must have a permit or interim status for the treatment, storage and/or disposal of any hazardous waste during the active life of the unit.

413. Since at least 2003 and continuing to at least March 2008, Defendant routinely treated, stored and disposed of wastewaters from sulfuric acid production, D002 hazardous waste, in or near the Mosquito Pond, a surface impoundment.

285. Defendant neither had a RCRA hazardous waste permit nor interim status for treatment, storage or disposal of hazardous waste in the Mosquito Pond and has therefore violated § 403.722, F.S. (Section 3005 of RCRA, 42 U.S.C. § 6925) and the applicable regulatory requirements of F.A.C. Rules 62-730.180 and 62.730.220 (40 C.F.R. Parts 264, Subparts A-G, K and CC, and 270).

414. Defendant is liable for injunctive relief and civil penalties pursuant to Section 3008(a) of RCRA, 42 U.S.C. § 6928(a), and § 403.727, F.S. for each day that it treated, stored, and/or disposed of hazardous waste in its surface impoundment at its Mulberry Facility without a permit or interim status.

xxxix. Thirty-Ninth Claim for Relief

(Failure to Perform Land Disposal Determination)

415. The allegations in Paragraphs 1 through 36 and 397 through 414 are realleged and incorporated herein by reference.

416. Pursuant to F.A.C. Rule 62-730.183 (40 C.F.R. § 268.7(a)(1)), Defendant is required, among other things, to determine if its hazardous waste needs to be treated before it can be land disposed.

417. Since at least 2003 and continuing to at least March 2008, Defendant routinely generated wastewaters from the regeneration of demineralizer units associated with sulfuric acid production, which are D002 hazardous wastes, and failed to determine whether these wastes must be treated before they can be land disposed.

418. Defendant has violated F.A.C. Rule 62-730.183 (40 C.F.R. § 268.7(a)(1)), for failure to make a hazardous waste determination before land disposal.

419. Defendant is liable for injunctive relief and civil penalties pursuant to Section 3008(a) of RCRA, 42 U.S.C. § 6928(a), and § 403.727, F.S. for each day that it failed to determine whether these hazardous wastes generated at its Mulberry Facility must be treated before they can be land disposed.

xl. Fortieth Claim for Relief

(Failure to Meet Land Disposal Restrictions for Prohibited Hazardous Wastes)

420. The allegations in Paragraphs 1 through 36 and 397 through 419 are realleged and incorporated herein by reference.

421. Pursuant to F.A.C. Rule 62-730.183 (40 C.F.R. § 268.9(c)), Defendant, among other things, is prohibited from land disposing a waste that exhibits a characteristic under F.A.C. Rule

62-730.030(1) (Subpart C of 40 C.F.R. Part 261) unless the waste complies with the treatment standards under F.A.C. Rule 62-730.183 (Subpart D of 40 C.F.R. Part 268).

422. Pursuant to F.A.C. Rule 62-730.183 (Subpart D of 40 C.F.R. Part 268), corrosive wastewaters, must meet the DEACT standard before the waste can be land disposed.

423. Since at least 2003 and continuing to at least March 2008, Defendant had land disposed of wastewaters from the regeneration of demineralizer units associated with sulfuric acid production, which are D002 hazardous waste, in the Mosquito Pond without meeting the DEACT standard prior to land disposal.

424. Defendant is liable for injunctive relief and civil penalties pursuant to Section 3008(a) of RCRA, 42 U.S.C. § 6928(a), and § 403.727, F.S., for each day that it failed to meet the DEACT standard set forth at F.A.C. Rule 62-730.183 (40 C.F.R. § 268.40(a)) prior to land disposing prohibited waste in surface impoundments at the Mulberry Facility, in violation of F.A.C. Rule 62-730.183 (40 C.F.R. §§ 268.40(a) and 268.9(c)).

F. GENERAL SOUTH PIERCE FACILITY ALLEGATIONS

Facility and Process Description

425. The South Pierce Facility was formerly a sulfuric acid, phosphoric acid, FSA, MGA, and granular triple superphosphate (GTSP) production facility.

426. On May 31, 2006, the South Pierce Facility idled all operations with the exception of sulfuric acid production.

427. On November 17, 2010, the South Pierce Facility received a final closure permit from FDEP and began closing its phosphogypsum stack system.

428. The South Pierce Facility manufactures 1800 tons of sulfuric acid per day.

429. On December 9, 2003, EPA conducted a CEI. On November 18, 2004, EPA conducted a CEI, and on December 16, 2004, EPA conducted a SI at the South Pierce Facility to determine the facility's compliance with state and federal RCRA requirements.

Sulfuric Acid Production

430. The South Pierce Facility produces sulfuric acid in two plants on-site.

431. Hazardous waste generated from the South Pierce Facility's sulfuric acid plants include wastewater from regenerating the ion exchange resin within demineralizer units. The cationic exchange resin is regenerated with sulfuric acid and the anionic exchange resin is regenerated with sodium hydroxide. The South Pierce Facility discharged hazardous regeneration wastewater to an elementary neutralization unit (ENU) for treatment. On 20 days in 2002 and 166 days in 2003, the wastewater from the ENU was not properly treated and was still hazardous after leaving the ENU. The ENU discharged to an earthen ditch that flowed to an earthen surface impoundment.

432. Sulfuric acid manufacturing and storage is not mineral processing and wastes generated from this process are not subject to the Bevill Exclusion.

SOUTH PIERCE FACILITY CLAIMS FOR RELIEF

xli. Forty-First Claim for Relief

(Failure to Make Hazardous Waste Determinations)

433. The allegations in Paragraphs 1 through 36 and 425 through 432 are realleged and incorporated herein by reference.

434. Pursuant to F.A.C. Rule 62-730.160(1) (40 C.F.R. § 262.11), Defendant, as a generator of solid waste, is required to make a hazardous waste determination.

435. At the time of the December 9, 2003 CEI, the November 18, 2004 CEI, and the December 16, 2004 SI, Defendant routinely generated wastewaters from the regeneration of demineralizer units associated with sulfuric acid production for which hazardous waste determinations had not been made.

436. Based on EPA's knowledge of the processes at the South Pierce Facility and the December 9, 2003 CEI, the November 18, 2004 CEI, and the December 16, 2004 SI, EPA determined the wastewaters from the regeneration of demineralizer units associated with sulfuric acid production are hazardous.

437. Defendant is liable for injunctive relief and civil penalties pursuant to Section 3008(a) of RCRA, 42 U.S.C. § 6928(a), and § 403.727, F.S., for each day that it failed to make a hazardous waste determination for solid wastes generated at its South Pierce Facility as required by F.A.C. Rule 62-730.160(1) (40 C.F.R. § 262.11).

xlii. Forty-Second Claim for Relief

(Treatment, Storage and Disposal of Hazardous Waste at the Sulfuric Acid Plant in a Surface Impoundment without a Permit or Interim Status in Violation of § 403.722 F.S. ((Section 3005 of RCRA, 42 U.S.C. § 6925) and the applicable regulatory requirements found at F.A.C. Rules 62-730.180 and 62-730.220 (40 C.F.R. Part 264, Subparts A-G, K and CC, and Part 270)).

438. The allegations in Paragraphs 1 through 36 and 425 through 437 are realleged and incorporated herein by reference.

439. Section 403.722 F.S. (RCRA Section 3005(a), 42 U.S.C. § 6925(a)), and F.A.C. Rule 62-730.180 (40 C.F.R. Parts 264, Subparts A-G, K and CC, and 270), require, among other things, that the owner and operator of a hazardous waste management unit must have a permit or interim status for the treatment, storage and/or disposal of any hazardous waste during the active life of the unit.

440. Since at least 2003 and continuing to at least the filing date of this Complaint, Defendant has routinely treated, stored and disposed of wastewaters from sulfuric acid production, a D002 hazardous waste, in its surface impoundment.

286. Defendant neither has a RCRA hazardous waste permit nor interim status for treatment, storage or disposal of hazardous waste in its surface impoundment, and has therefore violated § 403.722, F.S. (Section 3005 of RCRA, 42 U.S.C. § 6925) and the applicable regulatory requirements of F.A.C. Rules 62-730.180 and 62.730.220 (40 C.F.R. Parts 264, Subparts A-G, K and CC, and 270).

441. Defendant is liable for injunctive relief and civil penalties pursuant to Section 3008(a) of RCRA, 42 U.S.C. § 6928(a), and § 403.727, F.S. for each day that it treated, stored, and/or disposed of hazardous waste in its surface impoundment at its South Pierce Facility without a permit or interim status.

xliii. Forty-Third Claim for Relief

(Failure to Perform Land Disposal Determinations)

442. The allegations in Paragraphs 1 through 36 and 425 through 441 are realleged and incorporated herein by reference.

443. Pursuant to F.A.C. Rule 62-730.183 (40 C.F.R. § 268.7(a)(1)), Defendant is required, among other things, to determine if its hazardous waste needs to be treated before it can be land disposed.

444. For 20 days in 2002 and 166 days in 2003, Defendant generated wastewaters from the sulfuric acid production equipment in the Sulfuric Acid Plant, D002 hazardous wastes, and failed to determine whether these wastes must be treated before they can be land disposed.

445. Defendant is liable for injunctive relief and civil penalties pursuant to Section 3008(a) of RCRA, 42 U.S.C. § 6928(a), and § 403.72, F.S. for each day that it failed to determine whether these hazardous wastes generated at its South Pierce Facility must be treated before they can be land disposed.

xliv. Forty-Fourth Claim for Relief

(Failure to Meet Land Disposal Restrictions for Prohibited Hazardous Wastes)

446. The allegations in Paragraphs 1 through 36 and 425 through 445 are realleged and incorporated herein by reference.

447. Pursuant to F.A.C. Rule 62-730.183 (40 C.F.R. § 268.9(c)), Defendant, among other things, is prohibited from land disposing a waste that exhibits a characteristic under F.A.C. Rule 62-730.030(1) (Subpart C of 40 C.F.R. Part 261), unless the waste complies with the treatment standards under F.A.C. Rule 62-730.183 (Subpart D of 40 C.F.R. Part 268).

448. Pursuant to F.A.C. Rule 62-730.183 (Subpart D of 40 C.F.R. Part 268), corrosive wastewaters must meet the DEACT standard before the waste can be disposed.

449. For 20 days in 2002 and 166 days in 2003, Mosaic land disposed of wastewaters from the sulfuric acid production equipment in the Sulfuric Acid Plant, D002 hazardous wastes, in a surface impoundment, which wastes did not meet the DEACT standard prior to land disposal.

450. Defendant is liable for injunctive relief and civil penalties pursuant to Section 3008(a) of RCRA, 42 U.S.C. § 6928(a), and § 403.727, F.S., for each day that it failed to meet the standards set forth at F.A.C. Rule 62-730.183 (40 C.F.R. § 268.40(a)) prior to land disposing prohibited waste in its surface impoundment at the South Pierce Facility, in violation of F.A.C. Rule 62-730.183 (40 C.F.R. § 268.40(a)).

xlvi. Forty-Fifth Claim for Relief

(Failure to Prepare an Adequate Cost Estimate for Closure)

451. The allegations in Paragraphs 1 through 36 and 425 through 450 are realleged and incorporated herein by reference.

452. Pursuant to F.A.C. Rule 62-730.180(1) (40 C.F.R. § 264.140(a)), each owner or operator is required to meet the requirements of 40 C.F.R. § 264.142 (Cost Estimate for Closure).

453. Pursuant to F.A.C. Rule 62-730.180(1) (40 C.F.R. § 264.142(a)), each owner or operator must have a detailed written estimate, in current dollars, of the cost of closing the facility in accordance with the requirements in 40 C.F.R. §§ 264.111 through 264.115 and the other applicable closure requirements listed in 40 C.F.R. § 264.142(a).

454. Since at least the December 9, 2003 and November 18, 2004 CEIs, and the December 16, 2004 CEI and SI, and continuing through at least the date of the filing of this Complaint, Defendant had not prepared an adequate cost estimate for closure of its South Pierce Facility in violation of the requirements of F.A.C. Rule 62-730.180(1) (40 C.F.R. §§ 264.111 through 264.115) and the other applicable closure requirements listed in 40 C.F.R. § 264.142(a).

455. Defendant is liable for injunctive relief and civil penalties pursuant to Section 3008(a) of RCRA, 42 U.S.C. § 6928(a), and the § 403.727, F.S. for each day that it failed to prepare an adequate cost estimate for the closure of its South Pierce surface impoundment.

xlvi. Forty-Sixth Claim for Relief

(Failure to Establish Adequate Financial Assurance for Closure)

456. The allegations in Paragraphs 1 through 36 and 425 through 455 are realleged and incorporated herein by reference.

457. Pursuant to F.A.C. Rule 62-730.180(1) (40 C.F.R. § 264.140(a)), each owner or operator of a treatment, storage and disposal facility must establish financial assurance for closure of the facility (Financial Assurance for Closure).

458. Pursuant to F.A.C. Rule 62-730.180(1) (40 C.F.R. §§ 264.143(a)), the owner or operator must choose from the options set forth at F.A.C. Rule 62-226(5) and (6) (40 C.F.R. § 264.143(a) through (f)).

459. Since at least the December 9, 2003 and November 18, 2004 CEIs, and the December 16, 2004 SI, and continuing through at least the date of the filing of this Complaint, Defendant had not established financial assurance for closure of its hazardous waste unit (surface impoundment) at its South Pierce Facility in violation of F.A.C. Rule 62-730.180(1) (40 C.F.R. § 264.143(a)).

460. Defendant is liable for injunctive relief and civil penalties pursuant to Section 3008(a) of RCRA, 42 U.S.C. § 6928(a), and the § 403.727, F.S. for each day that it failed to establish adequate financial assurance for closure of its South Pierce surface impoundment.

xlvi. Forty-Seventh Claim for Relief

(Failure to Prepare an Adequate Cost Estimate for Post-Closure Care)

461. The allegations in Paragraphs 1 through 36 and 425 through 460 and are realleged and incorporated herein by reference.

462. Pursuant to F.A.C. Rule 62-730.180(1) (40 C.F.R. § 264.140(b)), each owner or operator of disposal facilities, piles, surface impoundments, tank systems and containment buildings, must prepare a cost estimate for post-closure care of its facility to meet the requirements of F.A.C. Rule 62-730.180(1) (40 C.F.R. § 264.144) (Cost Estimate for Post-Closure Care).

463. Pursuant to F.A.C. Rule 62-730.180(1) (40 C.F.R. § 264.144(a)), the owner or operator of a disposal surface impoundment required under 40 C.F.R. § 264.228 to prepare a contingent

closure and post-closure plan, must have a detailed written estimate, in current dollars, of the annual cost of post-closure monitoring and maintenance of the facility in accordance with F.A.C. Rule 62-730.180(1) (40 C.F.R. §§ 264.117 through 264.120, and 40 C.F.R. § 264.228).

464. Since at least the December 9, 2003 and November 18, 2004 CEIs, and the December 16, 2004 SI, and continuing through at least the date of the filing of this Complaint, Defendant did not have an adequate detailed written estimate, in current dollars, of the annual cost for post-closure monitoring and maintenance of its South Pierce Facility in accordance with the applicable post-closure care regulations set forth at F.A.C. Rule 62-730.180(1) (40 C.F.R. §§ 264.117 through 264.120, and 40 C.F.R. § 264.228).

465. Defendant is liable for injunctive relief and civil penalties pursuant to Section 3008(a) of RCRA, 42 U.S.C. § 6928(a), and the § 403.727, F.S. for each day that it failed to prepare an adequate post-closure care cost estimate for its South Pierce surface impoundment.

xlvi. Forty-Eighth Claim for Relief

(Failure to Establish Adequate Financial Assurance for Post-Closure Care)

466. The allegations in Paragraphs 1 through 36 and 425 through 465 are realleged and incorporated herein by reference.

467. Pursuant to F.A.C. Rule 62-730.180(1) (40 C.F.R. § 264.140(b)), each owner or operator of disposal facilities, piles, surface impoundments, tank systems and containment buildings are required to meet the requirements of F.A.C. Rule 62-730.180(1) and F.A.C. Rule 62-730.226 (40 C.F.R. § 264.145) (Financial Assurance for Post-Closure Care).

468. Pursuant to F.A.C. Rule 62-730.180(1) (40 C.F.R. § 264.145), the owner or operator of a hazardous waste unit subject to the requirements of 40 C.F.R. § 264.144 must establish financial assurance for post-closure care in accordance with the approved post-closure plan for its facility

60 days prior to the initial receipt of hazardous waste or the effective date of the regulation, whichever is later.

469. Since at least the December 9, 2003 and November 18, 2004 CEIs, and the December 16, 2004 SI, and continuing through at least the date of the filing of this Complaint, Defendant was subject to the requirement of F.A.C. Rule 62-730.180(1) (40 C.F.R. § 264.145) and had not established adequate financial assurance for post-closure care.

470. Defendant is liable for injunctive relief and civil penalties pursuant to Section 3008(a) of RCRA, 42 U.S.C. § 6928(a), and § 403.727, F.S. for each day that it failed to establish adequate financial assurance for post-closure care at its South Pierce surface impoundment

xlix. Forty-Ninth Claim for Relief

(Failure to Establish Adequate Financial Assurance for Third Party Liability)

471. The allegations in Paragraphs 1 through 36 and 425 through 470 are realleged and incorporated herein by reference.

472. Owners and operators of treatment, storage and disposal facilities are required by F.A.C. Rule 62-730.180(1) (40 C.F.R. § 264.140(a)), to meet the requirements of 40 C.F.R. § 264.147(a) and F.A.C. Rule 62-730.226 (Liability Requirements).

473. Pursuant to F.A.C. Rule 62-730.180(1) (40 C.F.R. § 264.147(a)), the owner or operator of each treatment, storage and disposal facility must establish financial responsibility for bodily injury and property damage to third parties caused by sudden accidental occurrences arising from operations of the facility, and must choose from the options as specified in paragraphs (a)(1) through (6) of 40 C.F.R. § 264.147.

474. Owners and operators of surface impoundments, landfills, land treatment facilities, or hazardous waste disposal miscellaneous units are required by F.A.C. Rule 62-730.180(1) (40

C.F.R. § 264.140(a)) to meet the requirements of 40 C.F.R. § 264.147(b) and F.A.C. Rule 62-730.226 (Liability Requirements).

475. F.A.C. Rule 62-730.180(1) (40 C.F.R. § 264.147(b)), require that the owner or operator of each surface impoundment, landfill, land treatment facility, or hazardous waste disposal miscellaneous unit must establish financial responsibility for bodily injury and property damage to third parties caused by non-sudden accidental occurrences arising from operations of the facility, and must choose from the options as specified in paragraphs (b)(1) through (6) of 40 C.F.R. § 264.147.

476. Pursuant to F.A.C. Rule 62-730.180(1) (C.F.R. § 264.147(b)), owners and operators who are subject to 40 C.F.R. § 264.147(b) may combine coverage for sudden and non-sudden accidental occurrences.

477. Since at least the December 9, 2003 and November 18, 2004 CEIs, and the December 16, 2004 SI, and continuing through at least the date of the filing of this Complaint, Defendant had not established adequate financial responsibility for third party liability for sudden or non-sudden accidental occurrences using any of the options specified in paragraphs (a)(1) through (6) or (b)(1) through (6) of 40 C.F.R. § 264.147.

478. Defendant is liable for injunctive relief and civil penalties pursuant to Section 3008(a) of RCRA, 42 U.S.C. § 6928(a), and § 403.727, F.S. for each day that it failed to establish adequate financial responsibility for third party liability at its South Pierce Facility, in violation of 40 C.F.R. § 264.147 and Chapter 62-730, F.A.C

PRAYER FOR RELIEF

WHEREFORE, Plaintiffs, the United States and the Florida Department of Environmental Protection, respectfully request that this Court:


1. Order the Defendant to immediately comply with the statutory and regulatory requirements cited in this Complaint;
2. Assess civil penalties against the Defendant for up to the amounts provided pursuant to Sections 3008(a) and 3008(g) of RCRA, 42 U.S.C. §§ 6928(a) and 6928(g); Section 403.727, F.S.; and 28 U.S.C. § 2471, as amended by 31 U.S.C. § 3701; and
3. Grant the United States and the Florida Department of Environmental Protection such other relief as this Court deems just and proper.

Respectfully submitted,

FOR THE UNITED STATES OF AMERICA:

JOHN C. CRUDEN
Assistant Attorney General
Environment and Natural Resources Division
United States Department of Justice
950 Pennsylvania Avenue, NW
Washington, D.C. 20530

Date: 9/30/2015


DEBORAH M. REYHER
Senior Counsel
Environmental Enforcement Section
Environment and Natural Resources Division
United States Department of Justice
P.O. Box 7611
Ben Franklin Station
Washington, D.C. 20044
(202) 514-4113

CIVIL COMPLAINT: United States et al. v. Mosaic Fertilizer, LLC

FOR THE UNITED STATES OF AMERICA:

A. LEE BENTLEY, III
United States Attorney



Lacy R. Harwell, Jr.
Florida Bar No. 714623
Assistant United States Attorney
400 N. Tampa Street, Suite 3200
Tampa, FL 33602
Phone: (813) 274-6000
Fax : (813) 274-6358

OF COUNSEL:

JOAN REDLEAF DURBIN
Senior Attorney
Office of Regional Counsel
United States Environmental Protection Agency
Region 4
61 Forsyth Street, SW, 13th Floor
Atlanta, GA 30303


LESLIE OIF
Attorney-Advisor
Office of Civil Enforcement
Mail Code 2249A
United States Environmental Protection Agency
1200 Pennsylvania Avenue, N.W.
Washington, DC 20460

CIVIL COMPLAINT: United States et al. v. Mosaic Fertilizer, LLC

FOR THE FLORIDA DEPARTMENT OF ENVIRONMENTAL PROTECTION:

Date: 9-30-15

For



LARRY MORGAN
Senior Deputy General Counsel
Fla. Bar No. 0220205
Florida Department of Environmental Protection
3900 Commonwealth Blvd., M.S. 35
Tallahassee, Florida 32399-3000
Telephone (850) 245-2246
Facsimile (850) 245-2298
Email: larry.morgan@dep.state.fl.us

TABLE OF CONTENTS

I.	Jurisdiction and Venue	5
II.	Applicability	6
III.	Definitions	8
IV.	Civil Penalty	18
V.	Compliance Requirements	20
VI.	Work Takeover	41
VII.	Supplemental Environmental Project	43
VIII.	Reporting Requirements	45
IX.	Stipulated Penalties	49
X.	Force Majeure	52
XI.	Dispute Resolution	55
XII.	Information Collection and Retention	58
XIII.	Effect of Settlement/Reservation of Rights	61
XIV.	Costs	64
XV.	Notices	65
XVI.	Effective Date	67
XVII.	Retention of Jurisdiction	68
XVIII.	Modification	68
XIX.	Termination	69
XX.	Public Participation	72
XXI.	Signatories/Service	72
XXII.	Integration	73
XXIII.	Final Judgment	73
XXIV.	Appendices	73

WHEREAS, Plaintiffs, the United States of America (United States), on behalf of the United States Environmental Protection Agency (EPA), and the Florida Department of Environmental Protection (FDEP), which is the agency of the State of Florida to which the Florida Legislature has delegated the exclusive power and duty to enforce Chapter 403, Florida Statutes, including the authority to bring actions in courts of competent jurisdiction for violations of the Florida Resource Recovery and Management Act pursuant to §§ 403.121, 403.131, 403.161, 403.708, and 403.727(2), Florida Statutes (together the Plaintiffs), have filed a complaint alleging that Defendant Mosaic Fertilizer, LLC (Mosaic) has violated the Resource Conservation and Recovery Act (RCRA), 42 United States Code (U.S.C.) § 6901 et seq., and the Florida Resource Recovery and Management Act, § 403.702 et seq., Florida Statutes (F.S.), and the applicable regulations in 40 C.F.R. Parts 260-270, and in Chapter 62-730, Florida Administrative Code (F.A.C.) at its sulfuric acid, phosphoric acid and fertilizer manufacturing facilities located in Florida (Facilities);

WHEREAS, the Complaint includes allegations that Mosaic failed to characterize and illegally treated, stored and disposed of hazardous wastes from various processes at its Facilities, including: the production of sulfuric acid, diammonium phosphate (DAP) and monoammonium phosphate (MAP) fertilizer, and fluorosilicic acid (FSA); wastes generated during cleaning of the phosphoric acid plant and fertilizer plant equipment; and wastewaters generated from the scrubbers used to control air pollution from the phosphoric acid plants and from other chemical and waste management processes at its Facilities without a RCRA permit or interim status. The Complaint also alleges that Mosaic illegally placed hazardous wastes in a Phosphogypsum Stack System dedicated for managing phosphoric acid production wastes

exempt from hazardous waste regulation pursuant to the Bevill Exemption, 40 C.F.R.

§ 261.4(b)(7), thus violating Sections 3004 and 3005 of RCRA, 42 U.S.C. §§ 6924-25, and the applicable regulations in 40 C.F.R. Parts 260-270, and Sections 403.721 and 403.722, F.S, and the applicable regulations in Chapter 62-730, F.A.C., and that those hazardous wastes remain in the Phosphogypsum Stack System;

WHEREAS, Mosaic denies the applicability of Subtitle C of RCRA and the regulations promulgated thereunder to certain practices at the Mosaic Facilities that are the subject of the Complaint, denies the violations alleged in the Complaint, and maintains that it has been and remains in compliance with RCRA and is not liable for civil penalties or injunctive relief;

WHEREAS, the objective of the Parties in this Consent Decree is to resolve the civil claims alleged in the Complaint by 1) establishing certain injunctive relief and environmental projects, whereby Mosaic shall modify certain operating practices with respect to its management of hazardous wastes and Bevill-Exempt Wastes, implement environmental controls, remediation, and financial assurance, and undertake certain pollution reduction and other beneficial projects; and 2) assessing an appropriate penalty;

WHEREAS, Mosaic has conducted itself in good faith in its discussions with the Plaintiffs concerning the violations alleged in the Complaint, and has already implemented certain operational changes at its Facilities and remedial measures , obviating the need for certain injunctive relief;

WHEREAS, by agreeing to entry of this Consent Decree, Mosaic makes no admission of law or fact with respect to the allegations in the Complaint, and continues to deny any non-compliance or violation of any law or regulation identified therein or in this Consent Decree. For the purpose of avoiding litigation among the Parties, however, Mosaic and where

applicable its parent company, The Mosaic Company, agree to the requirements of this Consent Decree;

WHEREAS, the Parties agree that the United States' filing of the Complaint and entry into this Consent Decree constitute diligent prosecution by the United States and FDEP, under Section 7002(b)(1)(B) of RCRA, 42 U.S.C. § 6972(b)(1)(B), of all matters alleged in the Complaint and addressed by this Consent Decree through the date of lodging of this Consent Decree; and

WHEREAS, the Parties recognize, and the Court by entering this Consent Decree finds, that this Consent Decree has been negotiated by the Parties in good faith and will avoid litigation among the Parties and that this Consent Decree is fair, reasonable, and in the public interest.

NOW, THEREFORE, before the taking of any testimony, without the adjudication or admission of any issue of fact or law except as provided in Section I (Jurisdiction and Venue), below, and with the consent of the Parties,

IT IS HEREBY ADJUDGED, ORDERED, AND DECREED as follows:

I. JURISDICTION AND VENUE

1. This Court has jurisdiction over the subject matter of this action and over the Parties, pursuant to Section 3008(a) of RCRA, 42 U.S.C. § 6928(a), and 28 U.S.C. §§ 1331, 1332, 1345, 1355 and 1367. Venue is proper in this judicial district pursuant to 28 U.S.C. §§ 1331, 1332, 1345, 1355, 1367, 1391(b) and (c), and 1395(a), and Section 3008(a) and (g) of RCRA, 42 U.S.C. § 6928(a) and (g), because Mosaic's Facilities are located in this judicial district. For purposes of this Consent Decree, or any action to enforce this Consent Decree, the Parties consent to the Court's jurisdiction over this Consent Decree and any such action and over Mosaic and The Mosaic Company, and further consent to venue in this judicial district.

2. Pursuant to Section 3008(a)(2) of RCRA, 42 U.S.C. § 6928(a)(2), notice of the commencement of this action has been given to FDEP.

3. For purposes of this Consent Decree only, Mosaic agrees that the Complaint states claims upon which relief may be granted pursuant to Sections 3004 and 3005 of RCRA, 42 U.S.C. §§ 6924 and 6925, and Sections 403.721, 403.722, and 403.727, F.S.

II. APPLICABILITY

4. The obligations of this Consent Decree apply to and are binding upon the United States, FDEP, Mosaic, and, as provided herein, The Mosaic Company, and any successors, assigns, or other entities or persons otherwise bound by law. Rights granted to EPA under this Consent Decree may be exercised by FDEP upon the written agreement of EPA and FDEP with notice to Mosaic. Nothing in this Consent Decree shall apply to administrative or enforcement proceedings other than this action or an action to enforce this Consent Decree. Nor does anything in this Consent Decree relieve Mosaic of its obligation to comply with any federal and state laws applicable to activities that are not within the definition of Work in this Consent Decree.

5. No transfer of ownership or operation of all or a portion of a Facility, whether in compliance with the procedures of this Paragraph or otherwise, shall relieve Mosaic of its obligation to ensure that the terms of this Consent Decree are implemented, unless: (1) the transferee agrees in writing to undertake the obligations required by this Consent Decree and to be substituted for Mosaic as a Party to the Consent Decree and thus be bound by the terms thereof; and (2) the United States, after consultation with FDEP, consents in writing to relieve Mosaic and the Mosaic Company of their respective obligations under this Consent Decree pursuant to Section XVIII of this Consent Decree (Modification). At least thirty (30) Days prior

to a proposed transfer of Mosaic's obligations under this Consent Decree, or such other period agreed to by the Parties in writing: (i) Mosaic shall provide a copy of this Consent Decree to the proposed transferee, if not previously provided; and (ii) shall provide written notice of the prospective transfer, together with a copy of the proposed written agreement (subject to Paragraphs 88 and 89 of this Consent Decree and as may otherwise be agreed in writing) transferring obligations to the transferee, to EPA, FDEP, the United States Attorney for the Middle District of Florida, and the United States Department of Justice, in accordance with Section XV (Notices) of this Consent Decree, together with a request for approval. The United States' decision whether to approve the transferee's substitution for Mosaic under this Consent Decree, and what conditions may attend approval, will take into account: (i) the status of the projects in Appendix 6 (RCRA Compliance Schedule), (ii) whether the transferee has or will have prior to the transfer the financial and technical capability to comply with this Consent Decree, (iii) and other factors that may be deemed relevant, including but not limited to the environmental compliance history of the proposed transferee and environmental management capabilities of the proposed transferee. As set forth in Appendix 2, Paragraph 36, any such transfer will not include the Financial Assurance obligations specified for Mosaic therein, and therefore will include Financial Assurance conditions appropriate to the transferee. Any transfer of ownership or operation of all or a portion of the Facility without complying with this Paragraph constitutes a violation of this Consent Decree. The United States' refusal to approve, or approval with conditions for, the substitution of the transferee for Mosaic under this Consent Decree shall be subject to dispute resolution pursuant to Section XI (Dispute Resolution) of this Consent Decree, but any judicial review shall be conducted pursuant to Paragraph 70(a) of this

Consent Decree. If Mosaic does not prevail in such judicial review, Mosaic shall pay all costs incurred by the United States in connection with such judicial review, including attorney's fees.

6. Mosaic shall: (1) provide a copy of this Consent Decree to its President/CEO, Executive Vice Presidents, Senior Environmental Counsel, and the General Manager, Environmental Manager, and Maintenance Manager of each Facility, and shall ensure that any employees and contractors whose duties might reasonably include compliance with any provision of this Consent Decree are made aware of this Consent Decree and specifically aware of the requirements of this Consent Decree that fall within such person's duties; (2) place an electronic version of the Consent Decree on its internal environmental website; and (3) post notice of lodging of the Consent Decree and its availability in a location at each Facility where legal notices are posted. Mosaic shall be responsible for ensuring that all employees and contractors involved in performing any Work pursuant to this Consent Decree perform such Work in compliance with the requirements of this Consent Decree.

7. In any action to enforce this Consent Decree, Mosaic shall not raise as a defense the failure by any of its officers, directors, employees, agents, or contractors to take any actions necessary to comply with the provisions of this Consent Decree.

III. DEFINITIONS

8. Every term expressly defined by this Section shall have the meaning given that term herein, regardless of whether it is elsewhere defined in federal or state law. Every other term used in this Consent Decree that is also a term used under RCRA, as amended, 42 U.S.C. §§ 6901 et seq., its implementing regulations, or the Florida Resource Recovery and Management Act, Sections 403.702 et seq., F.S., and Chapter 62-780, F.A.C., shall have the same meaning in this Consent Decree as such term has under RCRA or under federal or state

regulations. In the case of a conflict between federal and state definitions, federal definitions shall control. For purposes of this Consent Decree, whenever terms defined below or in Appendices 1-9 hereto are used in this Consent Decree, such definitions shall apply:

a. Animal Feed Ingredient Production (AFIP) is the production of calcium phosphate animal feed product ingredients from the reaction of First Saleable Product, phosphate rock, limestone, and/or soda ash which takes place in the area(s) of the New Wales Facility identified in the Facility Report for that Facility;

b. Bevill-Exempt Wastes shall mean Phosphogypsum and Process Wastewater from phosphoric acid production through mineral processing, which are solid wastes excluded from hazardous waste regulation pursuant to 40 C.F.R. § 261.4(b)(7)(ii)(D) and (P);

c. Big Holding Tank (BHT) shall mean the tank(s) that Mosaic will install as compliance projects and that are designated as Big Holding Tank(s) in a Facility's Facility Report;

d. BHT Effluent shall mean the output solution consisting of any or all of the inputs to the BHT that are described in the Facility's Facility Report;

e. BHT Recovery Units comprise the BHT and those units in Downstream Operations from which, as set forth in a Facility's Facility Report, cleaning wastes and other materials will be circulated to the BHT for recovery in Upstream Operations or reuse as a cleaning solution following completion of the relevant compliance projects;

f. Closing Facilities shall mean the Green Bay and South Pierce Facilities.

g. Complaint shall mean the complaint filed by the United States and FDEP in this action;

h. Consent Decree shall mean this Consent Decree and all Appendices identified in Section XXIV (Appendices) and attached hereto. In the event of any conflict between this Consent Decree and any Appendix hereto, this Consent Decree shall control;

i. Corrective Action Work :
shall mean 1) the activities described in Paragraphs 17 - 19 of Appendix 1, Attachment A; 2) the activities described in Section II.D of Appendix 1, Attachment B; and/or 3) other activities taken at the express direction of EPA or FDEP pursuant to their respective legal authorities to address a release of:

a) the following products, including intermediates and wastes: phosphoric acid, sulfuric acid, and FSA;

b) the following cleaning solutions, including entrained wastes and solids: SACS, PACS, and FSACS;

c) Process Wastewater, including mixtures and entrained wastes and solids;

d) Phosphogypsum Stack System Wastewater, including mixtures and entrained wastes and solids;

e) BHT Effluent or GHT Effluent, including entrained wastes and solids
when such releases occur: a) within AFIP, Upstream Operations, Downstream Operations, or the Process Wastewater RO Plants; b) from Mixed-Use, Grandfathered, or Recovery Units; or c) from the Phosphogypsum Stack System, as identified in a Facility's Facility Report. Corrective Action Work does not include other activities to be taken at the direction of EPA or FDEP pursuant to their residual authorities to address other releases of hazardous waste and/or hazardous constituents that may affect human health and the environment, which directions and

activities will be undertaken outside of, and will not be subject to, this Consent Decree (“Non-CD Corrective Action”);

j. DAP shall mean diammonium phosphate, which is manufactured in Granulation;

k. Day shall mean a calendar day unless expressly stated to be a business day. In computing any period of time under this Consent Decree, where the last day would fall on a Saturday, Sunday, or federal or State of Florida holiday, the period shall run until the close of business of the next business day;

l. Defendant or Mosaic shall mean Mosaic Fertilizer, LLC. Mosaic’s parent company, The Mosaic Company, shall be referred to by its full corporate name;

m. Downstream Operations shall mean all Facility operations involving the storage, management, transport, treatment, disposal or further processing of the First Saleable Product, manufacturing operations that use the First Saleable Product as a feedstock, and fluorosilicic acid (FSA) production operations, unless designated as a Mixed-Use Unit, Grandfathered Unit, or units in AFIP in that Facility’s Facility Report;

n. EPA shall mean the United States Environmental Protection Agency and any of its successor departments or agencies;

o. Effective Date is defined in Section XVI (Effective Date);

p. Facility or Facilities shall mean any one or more of Mosaic’s Florida operations at the following locations: Bartow, Riverview, Green Bay, South Pierce, and New Wales, which include manufacturing plants, Phosphogypsum Stack Systems, and such other contiguous or adjacent property owned and/or operated by Mosaic, as delineated in Appendix 3, Site Maps. This does not include the former CF Industries, Inc. facilities at Plant City and Bartow, Florida.

For the purposes of Section XIII (Effect of Settlement/Reservation of Rights), Facilities also shall include the former Mulberry Phosphate Fertilizer facility located at Mulberry, Florida.

q. Facility Reports shall mean the reports dated September 8, 2015, and attached hereto collectively as Appendix 4, prepared by EPA following inspections of Mosaic's Bartow, Riverview, and New Wales Facilities, which identify each Facility's Upstream, and Downstream Operations, its Mixed-Use Units, Recovery Units, and Grandfathered Units, compliance projects, and proposed future installations, and for the New Wales Facility AFIP area(s);

r. FDEP shall mean the State of Florida Department of Environmental Protection and any of its successor departments or agencies;

s. Financial Assurance shall mean financial assurance for the benefit of EPA and FDEP in order to ensure coverage for Third-party Liability, Phosphogypsum Stack System Closure and Long Term Care, as set forth in Appendix 2 (Financial Assurance) of this Consent Decree;

t. First Saleable Product shall mean:

1) Merchant Grade Acid (MGA), whether or not it is actually placed into commerce; or, if applicable,

2) any intermediate phosphoric acid product with a P_2O_5 content less than or equal to MGA that is diverted from further processing into MGA in order to be placed into commerce, further concentrated above 54% P_2O_5 (by weight), or used as a feedstock in manufacturing MAP/DAP, Superphosphoric Acid (SPA), Purified Acid, or other chemical manufacturing products;

u. Florida Phosphogypsum Rules shall mean Sections 376.30701, 403.087, 403.0876, 403.088, 403.0885, 403.121, 403.4154, and 403.4155, F.S.; and the rules promulgated

thereunder in Chapters 62-4, 62-520, 62-620, 62-672, 62-673, 62-777 and 62-780, F.A.C., as they may be amended (including any guidance materials incorporated therein), pertaining to the operation and closure of phosphoric acid facilities within the State, including any alternative measures approved in writing by FDEP according to the terms of F.A.C. 62-673.310 (Alternative Procedures and Requirements);

v. FSA shall mean fluorosilicic acid (H_2SiF_6);

w. FSA Cleaning Solution (FSACS) shall mean a solution of FSA or wastewater from FSA production (excluding waste solids not entrained in cleaning solutions but instead mechanically removed from FSA production, such as filtration residue, tank bottoms, and Swift Tower clean-out residue) with Non-Hazardous Aqueous Cleaning Solution (NHACS), Phosphogypsum Stack System Wastewater, and/or Process Wastewater used for cleaning pipes, tanks or other equipment;

x. Granular Holding Tank (GHT) shall mean the tank(s) that Mosaic will install as compliance projects and that are designated as Granular Holding Tank(s) in a Facility's Facility Report;

y. GHT Effluent shall mean the output solution consisting of any or all of the inputs to the GHT that are described in the Facility's Facility Report;

z. GHT Recovery Units comprise the GHT and those units in Granulation from which, as set forth in a Facility's Facility Report, cleaning wastes and other materials will be circulated to the GHT for recovery or reuse as a cleaning solution following completion of the relevant compliance projects;

aa. Grandfathered Unit shall mean a pipe, tank and/or other production, storage, or transportation unit in Downstream Operations specifically identified in a Facility's Facility Report as not feasibly segregable from Upstream Operations;

bb. Granulation shall mean the process of converting liquid phosphoric acid, ammonia, secondary nutrients, and/or micronutrients into solid ammonium phosphate fertilizer in Downstream Operations;

cc. Interest shall mean the interest rate specified in 28 U.S.C. § 1961;

dd. MAP shall mean monoammonium phosphate, which is manufactured in Granulation;

ee. Merchant Grade Acid (MGA) shall mean phosphoric acid that is typically 52% to 54% (by weight) of P_2O_5 but may vary slightly across the phosphoric acid industry, manufactured from the direct reaction of phosphate rock and sulfuric acid and containing less than one percent (1%) solids content;

ff. Mixed-Use Unit shall mean a pollution control device, pipe, tank and/or other production, storage, or transportation unit specifically identified in a Facility's Facility Report as serving both Upstream Operations and Downstream Operations or serving both AFIP and Downstream Operations (and at New Wales also serving Upstream Operations);

gg. Non-Hazardous Aqueous Cleaning Solution (NHACS) shall mean an aqueous solution, including without limitation fresh water, non-hazardous condensate, non-hazardous recycled water, and non-hazardous recovered groundwater, used for cleaning pipes, tanks or other equipment that, if evaluated as a solid waste before use, is not a RCRA listed or characteristic hazardous waste as defined by 40 CFR, Part 261, Subparts C and D;

hh. Operating Facilities shall mean the Bartow, New Wales, and Riverview Facilities.

ii. Paragraph shall mean a portion of this Consent Decree identified by an arabic numeral;

jj. Parties shall mean the United States, FDEP, Mosaic and, where applicable, The Mosaic Company;

kk. Phosphogypsum shall mean calcium sulfate and byproducts produced by the reaction of sulfuric acid with phosphate rock to produce phosphoric acid. Phosphogypsum is a solid waste within the definition of Section 1004(27) of RCRA, 42 U.S.C. § 6903(27), and Section 403.703(32) F.S.;

ll. Phosphogypsum Stack shall mean any defined geographic area associated with a phosphoric acid production plant in which Phosphogypsum is disposed of or stored, other than within a fully enclosed building, container or tank;

mm. Phosphogypsum Stack System shall mean the defined geographic area associated with a phosphoric acid production facility in which Phosphogypsum and Process Wastewater is disposed of or stored, together with all pumps, piping, ditches, drainage, conveyances, water control structures, collection pools, cooling ponds (including former cooling ponds that have been converted to lime treatment sludge ponds), surge ponds, auxiliary holding ponds, and regional holding ponds, and any other collection or conveyance system associated with the transport of Phosphogypsum from the phosphoric acid plant to the Phosphogypsum Stack, its management at the stack, and the Process Wastewater return to phosphoric acid production. This definition includes toe drain systems and ditches and other leachate collection systems, but does not include conveyances within the confines of the phosphoric acid or fertilizer production plant(s) or emergency diversion impoundments used in emergency circumstances caused by

rainfall events of high volume or duration for the temporary storage of Process Wastewater to avoid discharges to surface waters of the state;

nn. Phosphogypsum Stack System Wastewater shall mean waste water in the Phosphogypsum Stack System containing Bevill-Exempt Wastes commingled with hazardous wastes as alleged in the Complaint;

oo. Phosphoric Acid Cleaning Solution (PACS) shall mean a solution of phosphoric acid (generated from an operation in which at least 50 percent of the feedstock in a calendar year was from ores or minerals or beneficiated ores or minerals) and NHACS, Phosphogypsum Stack System Wastewater, and/or Process Wastewater used for cleaning pipes, tanks or other equipment;

pp. Process Wastewater shall mean process wastewater from phosphoric acid production. The following wastestreams constitute process wastewater from phosphoric acid production: water from phosphoric acid production operations through concentration to the First Saleable Product; process wastewater generated from Upstream Operations that is used to transport Phosphogypsum to the Phosphogypsum Stack; Phosphogypsum Stack runoff (excluding non-contact runoff); process wastewater generated from any uranium recovery in phosphoric acid production; process wastewater generated from non-ammoniated animal feed production (including defluorination, but excluding ammoniated animal feed production) operations that qualify as mineral processing operations based on the definition of mineral processing that EPA finalized on September 1, 1989; and process wastewater generated from a superphosphate production process that involves the direct reaction of phosphate rock with dilute phosphoric acid with a concentration less than Merchant Grade Acid [see 55 Fed. Reg. 2328, January 23, 1990];

qq. Purified Phosphoric Acid (PPA) shall mean a refined grade of phosphoric acid where contaminants have been removed from wet-process phosphoric acid through solvent extraction, chemical precipitation, filtration, or other purification processes to produce a purified phosphoric acid product suitable for food grade or other higher purity phosphoric acid applications (as of the date of lodging of this Consent Decree, Mosaic does not manufacture Purified Phosphoric Acid);

rr. RCRA Requirements shall mean the requirements of RCRA Subtitle C, the applicable regulations in 40 C.F.R. Parts 260-270, and Sections 403.721 and 403.722, F.S., and the applicable regulations in Chapter 62-730, F.A.C.

ss. RCRA Section 3013 Orders shall mean the administrative orders on consent with docket numbers RCRA-04-2006-4252 (Green Bay); RCRA-04-2006-4253 (Bartow); RCRA-04-2010-4252 (Riverview); RCRA-04-2011-4253 (South Pierce); and RCRA-04-2011-4252 (New Wales);

tt. Recovery Units shall mean both BHT Recovery Units and GHT Recovery Units;

uu. Section shall mean a portion of this Consent Decree identified by a roman numeral;

vv. Sulfuric Acid Cleaning Solution (SACS) shall mean a solution of sulfuric acid and NHACS, Phosphogypsum Stack System Wastewater, and/or Process Wastewater used for cleaning pipes, tanks or other equipment;

ww. Superphosphoric Acid (SPA) shall mean liquid phosphoric acid (not a solid phosphate product such as granulated triple superphosphoric acid) generally with a P_2O_5 content greater than MGA, resulting from the concentration of wet process acid that does not involve the

direct reaction of phosphate ore in such concentration operations (as of the date of lodging of this Consent Decree, Mosaic does not manufacture SPA);

xx. Treatment for the purposes of Paragraph 18(a) herein shall mean any method, technique, or process, including neutralization, designed to change the physical, chemical, or biological character or composition of a waste so as to neutralize such waste or so as to recover energy or material resources from the waste, or so as to remove or reduce a hazardous constituent of the waste or make it safer to transport, store, or dispose of, or amenable for recovery, amenable for storage, or reduced in volume;

yy. United States shall mean the United States of America, acting on behalf of EPA;

zz. Upstream Operations shall mean all phosphoric acid mineral processing operations resulting in the manufacture of the First Saleable Product; and

aaa. Work shall mean any activity that Mosaic must perform to comply with the requirements of this Consent Decree, including Appendices.

IV. CIVIL PENALTY

9. Within thirty (30) Days after the Effective Date of this Consent Decree, Mosaic shall pay the sum of \$4,100,000.00 as a civil penalty, together with Interest accruing from the date on which the Consent Decree is lodged with the Court, at the rate specified in 28 U.S.C. § 1961 as of the date of lodging, in accordance with Paragraphs 10 and 11.

10. Mosaic shall pay \$2,650,000.00, together with Interest accruing from the date on which the Consent Decree is lodged with the Court, to the United States by FedWire Electronic Funds Transfer (EFT) to the U.S. Department of Justice, in accordance with written instructions to be provided by the Financial Litigation Unit of the U.S. Attorney's Office for the Middle District of Florida, 400 N. Tampa Street, Suite 3200, Tampa, Florida, 33602 (813-274-6000) to

Mosaic within ten (10) days of lodging of the Consent Decree. At the time of payment, Mosaic shall send a copy of the EFT authorization form and the EFT transaction record, together with a transmittal letter, to the United States in accordance with Section XV (Notices) of this Consent Decree; by email to acctsreceivable.CINWD@epa.gov; and by mail to:

EPA Cincinnati Finance Office
26 Martin Luther King Drive
Cincinnati, OH 45268

The transmittal letter shall state that the payment is for the civil penalty owed pursuant to the Consent Decree in United States et al. v. Mosaic Fertilizer, LLC, and shall reference the civil action number and DOJ case number 90-7-1-08388.

11. Within thirty (30) Days after the Effective Date of this Consent Decree, Mosaic shall pay the sum of \$1,450,000.00 as a civil penalty, together with Interest accruing from the date on which the Consent Decree is lodged with the Court, to FDEP by EFT in accordance with instructions that will be provided by FDEP within ten (10) Days of the lodging of this Consent Decree. At the time of payment, Mosaic shall send a copy of the EFT authorization form and the EFT transaction record, together with a transmittal letter, to FDEP in accordance with Section XV (Notices) of this Consent Decree. The transmittal letter shall state that the payment is for a civil penalty owed pursuant to the Consent Decree in United States et al. v. Mosaic Fertilizer, LLC, and shall reference the FDEP OGC number 12-1041 and DOJ case number 90-7-1-08388.

12. Mosaic shall not deduct any penalties paid under this Consent Decree pursuant to this Section or Section IX (Stipulated Penalties) in calculating its federal or state or local income tax.

V. COMPLIANCE REQUIREMENTS

13. Compliance Projects and Schedule. Mosaic shall undertake the actions set forth in Appendix 5 (Best Management Practices (BMP) Plan) and Appendix 6 (RCRA Project Narrative and Compliance Schedule) of this Consent Decree to improve its waste management practices, pursuant to the description and schedule set forth in Appendix 6 (RCRA Project Narrative and Compliance Schedule). For any wastes generated by or managed in units that are identified in Section VI (Compliance Projects) of Appendix 4 (Facility Reports) as part of the compliance projects set forth in Appendix 6 (RCRA Project Narrative and Compliance Schedule) requiring installation, construction, modification, shut down, or replacement to cease commingling of hazardous wastes with Bevill-Exempt Wastes, and for any wastes that will be managed differently as a result of installing, constructing, modifying, shutting down, or replacing units, as specified in Section VI (Compliance Projects) of Appendix 4 (Facility Reports), Mosaic's waste management obligations under this Section V (Compliance Requirements) shall become effective upon completion of those compliance projects.

14. Hazardous Waste Determinations. Mosaic shall make a RCRA hazardous waste determination, pursuant to 40 C.F.R. § 262.11, of all solid wastes generated within AFIP, Upstream or Downstream Operations, or from Mixed-Use, Grandfathered Units, or Recovery Units other than: (a) Bevill-Exempt Wastes and; (b) those wastes that Paragraphs 15-18 of this Consent Decree allow to (i) be input to Upstream Operations or Downstream Operations or (ii) managed in Recovery Units or (iii) managed with Bevill-Exempt Wastes or (iv) transferred among Mosaic's Florida Facilities, and, if the wastes are hazardous, Mosaic shall manage such wastes in compliance with the RCRA Requirements.

15. Wastes from Upstream Operations and Co-Managed Wastes

(a) Provided that any Phosphogypsum Stack System ultimately receiving the wastes enumerated below is subject to the requirements of Appendix 1, Attachment B (Groundwater and Zone of Discharge Requirements), Attachment C (Phosphogypsum Stack System Construction and Operational Requirements), and Sections I, II, III and VI of Attachment D (Closure of Phosphogypsum Stacks/Stack Systems), as modified by Paragraph 24(b)(1), and the Financial Assurance requirements of this Consent Decree set forth in Paragraph 25 and Appendix 2 (collectively the Stack System Requirements), the following wastes may be: (i) input into Upstream Operations or AFIP; or (ii) treated, stored, managed, transported or disposed of together with Bevill-Exempt Wastes in accordance with this Consent Decree:

- (1) Process Wastewater, Phosphogypsum Stack System Wastewater, and Phosphogypsum;
 - (2) Wastes from AFIP;
 - (3) Wastes from air pollution control devices that are associated with Upstream Operations or AFIP or that are identified as Mixed-Use Units in a Facility's Facility Report, and
 - (4) Wastes generated from the use of Phosphogypsum Stack System Wastewater, Process Wastewater, or NHACS to clean pipes, tanks, process equipment, or other storage or transport units that are:
 - (i) Part of Upstream Operations or AFIP;
 - (ii) Serve to manage, store, or transport Bevill-Exempt Wastes;
- or

(iii) Identified as Mixed-Use or Grandfathered Units in a Facility's Facility Report.

(b) Prior to commencement of operations of the "Big Holding Tank and Wash Solution System in the Phosphoric Acid Plant" Compliance Project and the "Cleaning Solution Return Piping" Compliance Project of Section VI (Compliance Projects) of Appendix 4 (Facility Reports) at a Facility, Mosaic may continue to manage wastes generated from Upstream Operations, AFIP, Mixed-Use Units, Grandfathered Units, BHT Recovery Units, or units that serve to manage, store, or transport Bevill-Exempt Wastes as specifically documented in Mosaic's consolidated waste management practices submittal dated September 8, 2015.

(c) Following commencement of operations of the "Big Holding Tank and Wash Solution System in the Phosphoric Acid Plant" Compliance Project and the "Cleaning Solution Return Piping" Compliance Project of Section VI (Compliance Projects) of Appendix 4 (Facility Reports) for each Facility, the following wastes may be input to Upstream Operations via the BHT as described in the Facility's Facility Report set forth in Appendix 4 and in accordance with the BMP set forth in Appendix 5:

(1) Spills and leaks of all grades of phosphoric acid, sulfuric acid, FSA, SACS, PACS, FSACS, or BHT Effluent; or NHACS, Process Wastewater, or Phosphogypsum Stack System Wastewater when mixed with any of the preceding solutions due to spills, leaks, or cleaning of leaks and spills;

(2) Wastes generated from the use of SACS, PACS, BHT Effluent, FSA, FSACS, NHACS, Process Wastewater, and/or Phosphogypsum Stack Wastewater to clean pipes, tanks, process equipment, or other storage or transport units that are:

- (i) Part of Upstream Operations or AFIP;
- (ii) Serve to manage, store, or transport Bevill-Exempt Wastes;

or

- (iii) Identified as Mixed-Use, Grandfathered, or BHT Recovery

Units in a Facility's Facility Report.

In the event of a process upset after commencement of operations of the BHT and Cleaning Solution Return Piping Projects that prevents the input of SACS, PACS, BHT Effluent, FSA or FSACS to Upstream Operations via the BHT, Mosaic: (1) shall not discharge to the Phosphogypsum Stack System any SACS, PACS, BHT Effluent, FSA, or FSACS used in cleaning those units affected by the process upset; and (2) shall make a RCRA hazardous waste determination, pursuant to 40 C.F.R. § 262.11, of any cleaning wastes generated from BHT Recovery Units and not input to the BHT and, if the wastes are hazardous, shall manage such wastes in compliance with the RCRA Requirements.

(d) If Mosaic, in the cleaning of Upstream Operations, AFIP, Mixed-Use, Grandfathered, or BHT Recovery Units, uses any cleaning materials other than Phosphogypsum Stack System Wastewater, Process Wastewater, BHT Effluent, PACS, SACS, FSA, FSACS, or NHACS that, if evaluated as a solid waste before use, would be a RCRA listed or characteristic hazardous waste as defined by 40 C.F.R., Part 261, Subparts C and D and would generate a hazardous waste when mixed with Bevill-Exempt Process Wastewater under the Bevill Mixture Rule, 40 C.F.R. § 261.3(a)(2)(i) and (g)(4), then Mosaic shall make a RCRA hazardous waste determination pursuant to 40 C.F.R. § 262.11, of the cleaning waste and, if the waste is hazardous, Mosaic shall manage such waste in compliance with the RCRA Requirements.

(e) Mosaic shall manage any solids removed by means other than cleaning

solutions from Upstream Operations and AFIP, and from Mixed-Use, Grandfathered, and BHT Recovery Units in accordance with the BMP set forth in Appendix 5.

(f) Equipment maintenance, repair activities, and emergency situations in Downstream Operations at a Facility may occasionally require Mosaic to temporarily store or transport a First Saleable Product in or through tanks or pipes that are part of Upstream Operations, and/or Mixed-Use or Grandfathered Units. Provided that: a) the use of any individual unit in Upstream Operations, or any Mixed-Use or Grandfathered Unit, for such temporary storage of a First Saleable Product does not exceed ninety (90) Days consecutively or one-hundred twenty (120) Days cumulatively per calendar year; and b) if the First Saleable Product is not stored or transported for greater than ninety (90) Days consecutively outside of Downstream Operations, then the cleaning wastes generated from such units that are used for the temporary transport and storage of the First Saleable Product may be managed with wastes from Upstream Operations. Notice of such temporary use of tanks or pipes that are part of Upstream Operations, or of Mixed-Use or Grandfathered Units, for a First Saleable Product must be given to EPA and FDEP within seven (7) Days of the commencement of such temporary use, but advance approval will not be required. Mosaic shall keep a log of all such temporary uses. If Mosaic violates any of the time limits set forth in this Paragraph, Mosaic shall not manage cleaning wastes generated outside the prescribed time period with wastes from Upstream Operations. In the event of a second violation of any of these time limits within three-hundred and sixty-five (365) Days of a first violation, Mosaic within thirty (30) Days shall construct a separate system for the temporary transport and storage of the First Saleable Product, which system shall be part of Downstream Operations. Violations of the time limits set forth in this

Paragraph are not subject to Paragraph 32 (Correction of Non-Compliance) but may be subject to dispute resolution, but not judicial review, under Section XI of this Consent Decree (Dispute Resolution), or to a claim under Section X (Force Majeure).

16. Wastes from Downstream Operations. Unless otherwise authorized by Paragraphs 15(a), (b), (c), (e), or (f), Paragraphs 16 (a) - (d), below, or Paragraphs 17(a) or (b), Mosaic shall manage all hazardous wastes generated from Downstream Operations (including, without limitation, units that transport, store, treat, or manage the First Saleable Product (e.g., pipes, tanks, railcars, barges); chemical manufacturing processes that use the First Saleable Product as a feedstock (e.g., MAP/DAP, SPA or PPA processes); FSA production processes; pollution control devices, waste storage, transport and treatment units, cleaning wastes (liquids and solids), and spills and leaks from all such processes and units) in compliance with the RCRA Requirements, regardless of the use of any Bevill-Exempt Wastes as influent to such Downstream Operations. If any Mixed-Use Units or Grandfathered Units are replaced, modified, or reconfigured after the date of the relevant Facility Report such that they serve to manage, store or transport materials from Downstream Operations that are not identified in that Facility Report as being associated with those Units, they will be deemed to serve Downstream Operations, and any hazardous wastes generated thereafter from such Units will be subject to this Paragraph.

(a) Mosaic may re-use or recover certain wastes from Downstream Operations in Upstream or Downstream Operations as specifically documented in each Facility's Facility Report.

(b) Prior to commencement of operations of the Granular Holding Tank (GHT) pursuant to Section VI (Compliance Projects) of Appendix 4 (Facility Reports) at a Facility,

Mosaic may continue to manage wastes generated in GHT Recovery Units or Downstream Operations as specifically documented in Mosaic's consolidated waste management practices submittal dated September 8, 2015.

(c) Following commencement of operations of the Granular Holding Tank (GHT) pursuant to Section VI (Compliance Projects) of Appendix 4 (Facility Reports), the following wastes may be input to Downstream Operations via GHT Recovery Units or transferred to the BHT, as described in Section VI (Compliance Projects) of a Facility's Facility Report set forth in Appendix 4 and in accordance with the BMP set forth in Appendix 5:

(1) Spills and leaks of all grades of phosphoric acid, sulfuric acid, SACS, PACS, or GHT Effluent; or NHACS, Process Wastewater, or Phosphogypsum Stack System Wastewater when mixed with any of the preceding solutions due to spills, leaks, or cleaning of leaks and spills;

(2) Wastes generated from the use of Phosphogypsum Stack System Wastewater, Process Wastewater, NHACS, SACS, PACS, BHT Effluent, GHT Effluent, to clean pipes, tanks, process equipment, or other storage or transport units that are part of Downstream Operations.

In the event of a process upset after commencement of operations of the Granular Holding Tank that prevents the input of such wastes via GHT Recovery Units to Downstream Operations, Mosaic shall make a RCRA hazardous waste determination of the cleaning wastes generated from those units affected by the process upset, pursuant to 40 C.F.R. § 262.11 and, if the wastes are hazardous, shall manage such wastes in compliance with the RCRA Requirements.

(d) Mosaic shall manage any solids removed by means other than cleaning solutions from equipment in Granulation in accordance with the BMP set forth in Appendix 5.

17. FSA.

(a) FSA, FSACS, and wastewater carrying entrained solids from FSA production, a part of Downstream Operations, may be managed as described in Section IV.D (Fluorosilicic Acid (FSA) Standard Process Configuration) and Section VI Compliance Project 1 (Big Holding Tank and Wash Solution System in the Phosphoric Acid Plant) and Project 2 (Cleaning Solution Return Piping) of Appendix 4 (Facility Reports) for the Bartow and Riverview Facilities.

(b) Waste solids not entrained in cleaning solutions but instead mechanically removed from FSA production (such as filtration residue, tank bottoms, and Swift Tower clean-out residue) shall be managed in compliance with the BMP Plan set forth in Appendix 5.

(c) Wastes generated from FSA production that are not subject to Paragraphs 17(a) and (b) shall be managed in compliance with the RCRA Requirements.

18. Phosphogypsum Stack System Wastes.

(a) Wastes from Treatment of Phosphogypsum Stack System Wastes. Provided that any Phosphogypsum Stack System ultimately receiving the wastes complies with the Stack System Requirements set forth in Paragraph 15(a), wastes generated from the Treatment of materials in the Phosphogypsum Stack System through (i) the use of reverse osmosis or (ii) any other Treatment process that does not introduce into such materials hazardous constituents or other contaminants that would result in a violation of applicable discharge limits may be: (1) input to Upstream Operations; or (2) treated, stored, managed, transported and disposed of together with Bevill-Exempt Wastes, in accordance with this Consent Decree.

(b) Transfer of Phosphogypsum Stack System Wastes. Bevill-Exempt Wastes and those wastes allowed to be treated, stored, managed, transported and disposed of together

with Bevill-Exempt Wastes pursuant to Paragraphs 15-18(a) may be transferred among Mosaic's Florida Phosphogypsum Stack Systems as authorized by FDEP orders, permits, regulations and requirements for such transfers.

(c) The Consent Agreement and Final Orders entered into between EPA and Mosaic on March 27, 2009, Docket No. RCRA-04-2009-4005(b), and November 3, 2009, Docket No. RCRA-04-2010-4000(b), shall terminate as separate Orders as of the Effective Date of this Consent Decree.

19. Sulfuric Acid Plants. Mosaic shall manage hazardous wastes generated at the Facilities' sulfuric acid plants in accordance with applicable law.

20. Site Assessment and Corrective Action.

(a) Mosaic has already completed or will complete certain site assessment activities pursuant to existing RCRA Section 3013 Orders for each of its Facilities that are deemed to satisfy the site assessment requirements of Paragraphs 1-16 of Appendix 1, Attachment A (Site Assessment, Reporting and Corrective Action). Mosaic's obligations to complete the Corrective Action Work are part of the Work required by this Consent Decree, but shall be set forth in and governed by an administrative agreement, permit, or order issued by FDEP under its authorized state program, and subject to EPA's residual authorities under RCRA and Paragraphs 23 and 82 of this Consent Decree. Mosaic's performance of its obligations pursuant to the preceding sentence shall be subject to Paragraph 9 - 16 of Appendix 1, Attachment A, as applicable.

(b) Mosaic's obligations under Paragraphs 17-19 of Attachment A of Appendix 1 shall be deemed to be fully satisfied on the date that FDEP confirms Mosaic's certification that Mosaic has completed all requirements of any such administrative agreement, permit, or order issued by FDEP to govern the Corrective Action Work defined in Paragraph 8(i), provided that EPA does

not exercise its residual authorities under RCRA and this Consent Decree as set forth in Paragraph 23, below. Appendix 1, Attachment A is included as part of this Consent Decree in order to advise the Court and the public of sampling and analysis activities already completed or that will be completed by Mosaic, pursuant to the RCRA Section 3013 Orders, as part of its settlement with the United States and FDEP, and the Parties' intent to implement any necessary risk assessment and/or Corrective Action Work under FDEP's administrative authorities, and to reflect Plaintiffs' residual authority to secure necessary Corrective Action Work pursuant to their reservation of rights in Paragraphs 82 and 83 of this Consent Decree, and without prejudice to Non-CD Corrective Action that may be required at a Facility pursuant to Plaintiffs' residual authorities under federal, state, and local laws.

21. Phosphogypsum Stack System.

Paragraphs 21-23 set forth, respectively, the Work that Mosaic must perform relating to the Phosphogypsum Stack System (Paragraph 21), the means for determining when compliance with the Florida Phosphogypsum Rules will satisfy those Work requirements (Paragraph 22), and the conditions under which EPA may exercise its residual authorities to directly enforce those Work requirements (Paragraph 23).

(a) Mosaic shall comply with all requirements set forth in Appendix 1, Attachment B, Sections I, II.B, II.C, and II.D (Groundwater and Zone of Discharge Requirements), Attachment C (Phosphogypsum Stack System Construction and Operational Requirements), Attachment D (Closure of Phosphogypsum Stacks/Stack Systems), Attachment E (Critical Conditions and Temporary Measures), and Attachment G (Phosphogypsum Stack System Permanent Closure Application). Notwithstanding the foregoing, the provisions of Section VII (Closure of Unlined Systems in Phosphogypsum Stacks/Stack Systems) of Appendix

1, Attachment D (Closure of Phosphogypsum Stacks/Stack Systems) shall not apply to a Phosphogypsum Stack System or component thereof that: (i) has already undergone permanent closure pursuant to an FDEP permit or approval; (ii) began undergoing permanent closure prior to January 30, 2007; (iii) complies with or will comply with the requirements, exemptions and conditions of Appendix 7 (Alternative Liner Requirements) upon completion of the projects identified in Appendix 7; or (iv) for which an application for permanent stack closure in a manner that satisfies the requirements of Appendix 1, Attachment D has been submitted to FDEP and/or EPA as of the Date of the EPA Notice of Violation.

(b) Mosaic shall submit the Initial Phosphogypsum Stack System Closure Plan required in Appendix 1, Attachment D, Section II simultaneously with its first annual updated Cost Estimate submitted pursuant to Appendix 2, Paragraph 4(b).

22. EPA will consult periodically with FDEP regarding Mosaic's compliance with the Florida Phosphogypsum Rules which require Mosaic to perform the majority of the Work identified in Paragraph 21. Subject to EPA's reservation of rights in Paragraph 23, if Mosaic complies with the Florida Phosphogypsum Rules, using the definitions of Bevill-Exempt Wastes, Upstream Operations, Downstream Operations, AFIP, and Mixed-Use Units, Recovery Units, and Grandfathered Units set forth in this Consent Decree and employed in the Facility Reports, such compliance shall be deemed to satisfy the Work requirements of Appendix 1, Attachments B, C, D, E, and G, provided that Mosaic also complies with the following specific Work requirements of Appendix 1 that are different from the Florida Phosphogypsum Rules:

(a) Mosaic shall amend the Initial Phosphogypsum Stack System Closure Plan as needed to include the requirements of Rule 62-673.600(3), F.A.C., and a description of the physical configuration of the Phosphogypsum Stack System and process water inventory in accordance with Appendix 2 (Financial Assurance); and

(b) Mosaic shall amend the Permanent Phosphogypsum Stack System Closure Plans incorporated in the closure operation permit application to conform to the requirements in Rule 62-673.610(7), F.A.C., and must include: (1) a revised estimate of all costs associated with stack closing, long-term care and site-specific water management activities being undertaken under the Permanent Phosphogypsum Stack System Closure Plan in accordance with Appendix 2 (Financial Assurance); and (2) a description of the proposed method of demonstrating financial responsibility for the long-term monitoring and maintenance in accordance with Appendix 2 (Financial Assurance); and

(c) As of the fifth anniversary of the Effective Date of this Consent Decree, all Bevill-Exempt Wastes may only be placed in a Phosphogypsum Stack System: (i) that satisfies the requirements of Appendix 1, Attachment C (Phosphogypsum Stack System Construction and Operational Requirements); (ii) that satisfies the conditions of Appendix 7 (Alternative Liner Requirements); (iii) that Mosaic is addressing pursuant to Paragraph 24(b)(2); (iv) pursuant to Appendix 1, Attachment D (Closure of Phosphogypsum Stacks/Stack Systems); or (v) pursuant to Appendix 1, Attachment E (Critical Conditions and Temporary Measures) or pursuant to any corresponding provisions of the Florida Phosphogypsum Rules.

23. EPA reserves the right to fully and directly enforce all the requirements of Appendix 1, Attachment A, if EPA: (i) notifies Mosaic within sixty (60) Days of FDEP's issuance of an administrative agreement, permit, or order setting forth and governing the Corrective Action Work defined in Paragraph 8(i), that such administrative agreement, permit, or order does not adequately address the Corrective Action Work required under Paragraph 18 of Appendix 1, Attachment A; or (ii) after consultation with FDEP, notifies Mosaic that it has determined that Mosaic is not in compliance with an issued administrative agreement, permit, or order; or (iii) notifies Mosaic within sixty (60) Days of FDEP's failure to issue an administrative agreement, permit, or order for Corrective Action Work required under Paragraph 18 of Appendix 1, Attachment A. EPA further reserves the right to fully and directly enforce all the requirements of Appendix 1, Attachments B, Sections I, II.B, II.C, and II.D, and all the requirements of Appendix 1, Attachments C, D, E, and G, if it finds, after consultation with

FDEP, that Mosaic is not in compliance with the Florida Phosphogypsum Rules, or if the Florida Phosphogypsum Rules are modified and EPA determines, after consultation with FDEP, that such modifications do not comply with the Work requirements of the above-cited Attachments. Any decision by EPA to directly enforce these Work requirements shall not be subject to judicial review, but shall be subject to dispute resolution (other than judicial review) pursuant to Section XI (Dispute Resolution) of this Consent Decree, although Mosaic retains its right to invoke dispute resolution as set forth in Section XI (Dispute Resolution) regarding any liability for asserted non-compliance with the Work requirements of this Consent Decree, including any liability for stipulated penalties.

24. a. Completed Activities. Mosaic has already completed the following activities, in compliance with the below-referenced Consent Decree Paragraph(s) or Appendices/Attachments to this Consent Decree:

(1) Bartow (i) installation and activation of a new Batch Elementary Neutralization Unit (ENU) to improve the facility's ability to manage sulfuric acid waste streams (Paragraph 19); (ii) conversion of the #3 cooler scrubber to once-through water from a dedicated non-hazardous DAP Pond or fresh water (Paragraph 15(a)); (iii) FSA Spill and Leak Recovery System (Paragraph 15(a)); (iv) Perimeter Dike Assessments (Appendix 1, Attachment C - Phosphogypsum Stack System Construction and Operational Requirements); and (v) DAP #4 reslurry system (Paragraph 15(a));

(2) New Wales (i) modification of the demineralizer regeneration system to reclaim low pH cation regeneration water into the acid plants, thus reducing the load on the ENU (Paragraph 15(a)); (ii) Perimeter Dike Assessments (Appendix 1, Attachment C - Phosphogypsum Stack System Construction and Operational Requirements); (iii) Auxiliary

Holding Pond (AHP) slurry wall (Appendix 7); and (iv) Installation of Phosphoric Acid Spill and Leak Monitoring System (Paragraph 15(a)); and

(3) Riverview (i) Installation of FSA Spill and Leak Recovery System (Paragraph 15(a)); (ii) Lining of the “Floating Ditch” (Appendix 1, Attachment D - Closure of Phosphogypsum Systems); (iii) Perimeter Dike Assessments (Appendix 1, Attachment C - Phosphogypsum Stack System Construction and Operational Requirements); (iv) conversion of the #6 Granulation cooler scrubber to a closed-loop recirculated scrubber (Paragraph 15(a)); and (v) conversion of the #5 Granulation scrubber to non-hazardous scrubbing media (Paragraph 15(a)).

b. Liner Alternatives.

(1) The Plaintiffs agree that the Facilities’ Phosphogypsum Stack Systems (as documented in the Facility Report for each Facility and in Appendix 7 (Alternative Liner Requirements) to this Consent Decree), either (i) meet the liner requirements of Appendix 1, Attachment C (Phosphogypsum Stack System Construction and Operational Requirements); or (ii) complies or will comply with the requirements, exemptions and conditions of Appendix 7 (Alternative Liner Requirements) upon completion of the projects identified in Appendix 7, and thereby are or will be deemed to be environmentally protective and an acceptable alternative to the requirements of Appendix 1, Attachment C (Phosphogypsum Stack System Construction and Operational Requirements).

(2) In the event that Mosaic determines that it is not in compliance with the requirements, exemptions, and/or conditions set forth in Appendix 7 for a Facility, Mosaic within ninety (90) Days of identifying the non-compliance shall investigate the cause of the non-compliance and submit to EPA for approval an Evaluation of Remedial Options to address the

non-compliance. The Evaluation of Remedial Options must: (i) evaluate the cause of the failure to meet the requirements and/or conditions in Appendix 7; (ii) identify and evaluate those measures needed to return to compliance with Appendix 7; (iii) identify and evaluate potential remedial alternatives to address any groundwater contamination that has migrated beyond the Zone of Discharge permitted for the affected Facility as provided in Appendix 1, Attachment B (Section D); (iv) identify and evaluate potential remedial alternatives to prevent or mitigate further migration of groundwater contamination; and (v) recommend one of the identified remedial alternatives for implementation. FDEP retains its authority under Sections 62-673.400 and .650, F.A.C. to require that the Phosphogypsum Stack System at the affected Facility be lined if the remedial actions taken by Mosaic do not meet the requirements and conditions set forth in Appendix 7.

(3) If EPA, in consultation with FDEP, determines that Mosaic is not in compliance with the requirements, exemptions, and/or conditions set forth in Appendix 7 for a Facility, EPA shall so notify Mosaic in a written statement explaining the basis for its conclusion. Within ninety (90) Days of receiving such notice from EPA, Mosaic shall submit to EPA for approval, in consultation with FDEP, the Evaluation of Remedial Options as required by Paragraph 24(b)(2) or shall submit pursuant to Paragraphs 27-31 a written explanation of why it does not believe the alleged failure exists.

c. Zones of Discharge. Plaintiffs agree that Mosaic has a Zone of Discharge authorized by FDEP before the Effective Date of this Consent Decree at each of the following Facilities: Bartow, Riverview, Green Bay, South Pierce, and New Wales, and that such Zone of Discharge at each named Facility shall continue to apply unless modified pursuant to Section II.B. of Attachment B.

25. Financial Assurance. Mosaic shall secure and maintain Financial Assurance for the benefit of EPA and FDEP pursuant to the requirements of Appendix 2 (Financial Assurance) of this Consent Decree, in order to ensure coverage for: (a) Third-party Liability; and (b) Phosphogypsum Stack System Closure and Long-Term Care, including a corporate guarantee provided by The Mosaic Company and attached hereto as Appendix 2, Attachment I. Mosaic shall secure and maintain financial assurance for Corrective Action Work at the Facilities for the benefit of FDEP as required by any administrative agreement, permit or order issued by FDEP. If EPA, in lieu of FDEP, directs Corrective Action Work pursuant to this Consent Decree, then Mosaic shall secure and maintain financial assurance for Corrective Action Work for the benefit of EPA pursuant to Appendix 2, Section IV. To the extent that Mosaic establishes Financial Assurances that includes a cash deposit in a Trust Fund for the benefit of EPA and FDEP, under this paragraph pursuant to the requirements of Appendix 2, FDEP agrees such Trust Fund shall be a cash deposit arrangement under s. 403.4155(3)(b), F.S., for each of the Facilities in accordance with and with respect to the full amounts as specified under Schedule A of the Trust Agreement to be established hereunder. EPA and FDEP agree that Mosaic and FDEP intend to enter into a separate FDEP Alternate Procedure Order pursuant to Rule 62 673.310, F.A.C., or an equivalent state order, that will further address Mosaic's obligations under Chapter 62-673, F.A.C., with respect to the Phosphogypsum Stack Systems at the Facilities, and at other facilities owned or operated by Mosaic in Florida, and such Alternate Procedure Order shall not reduce or increase the Financial Assurances established hereunder. Mosaic's inability to secure and/or maintain adequate Financial Assurance shall in no way excuse performance of the Work or any other requirement of this Consent Decree.

26. In addition to the financial assurance information included in the reports required pursuant to Section VIII (Reporting Requirements) of this Consent Decree, Mosaic or The Mosaic Company as guarantor shall provide to EPA and FDEP, upon request, any information or reports that Plaintiffs are authorized to request pursuant to Section 3007 of RCRA, 40 C.F.R. Part 264, Subpart H, Rule 62-730.180 F.A.C., or any other applicable statutory or regulatory information-gathering authorities, regarding the financial status of Mosaic or The Mosaic Company as guarantor, the financial mechanism(s) provided by Mosaic or the Mosaic Company as guarantor to meet its obligation for Financial Assurance, and the financial institution or guarantor providing the financial mechanism(s) to secure Mosaic's or The Mosaic Company's obligations, pursuant to Appendix 2.

27. EPA Review of Submissions. All work plans, reports and other items that are developed and submitted to EPA for approval pursuant to this Consent Decree shall be complete and technically adequate. After review of any work plan, report, or other item that is required to be submitted, or revised and resubmitted, to EPA for approval pursuant to this Consent Decree, EPA, after consultation with FDEP, shall in writing: (a) approve the submission; (b) approve the submission upon specified conditions; (c) approve part of the submission and disapprove the remainder; or (d) disapprove the submission. In the event of disapproval of any portion of the submission, EPA shall include a statement of the reasons for such disapproval in its response. Plaintiffs' receipt or acceptance of information or notice, or approval of a submittal, does not bind Plaintiffs to the factual assertions and conclusions of the information, notice, or submittal.

28. If the submission is approved pursuant to Paragraph 27(a), Mosaic shall take all actions required by the work plan, report, or other document, in accordance with the schedules and requirements of the work plan, report, or other document, as approved. If the submission is

conditionally approved or approved only in part, pursuant to Paragraph 27(b) or (c), Mosaic shall, upon written direction from EPA, take all actions required by the approved work plan, report, or other item that EPA determines are technically severable from any disapproved portions, subject to Mosaic's right to dispute only the specified conditions, the disapproval, or the determination of the technical severability of portions of the submission under Section XI of this Consent Decree (Dispute Resolution).

29. If the submission is disapproved in whole or in part, pursuant to Paragraph 27(c) or 27(d), Mosaic shall, within sixty (60) Days or such other time as the Parties agree to in writing, correct all deficiencies and resubmit the plan, report, or other item, or disapproved portion thereof, for approval, in accordance with the preceding Paragraphs. If the submission has been previously disapproved, EPA may impose an earlier due-date for re-submission, but not less than fourteen (14) Days. If the re-submission is approved in whole or in part, Mosaic shall proceed in accordance with the preceding Paragraph.

30. Any stipulated penalties applicable to the original submission, as provided in Section IX (Stipulated Penalties) of this Consent Decree, shall accrue during the sixty (60)-Day period or other agreed period, but shall not be payable unless the re-submission is untimely or is disapproved in whole or in part; provided that, if the original submission was so deficient as to constitute a material breach of Mosaic's obligations under this Consent Decree, the stipulated penalties applicable to the original submission shall be due and payable notwithstanding any subsequent re-submission.

31. If a resubmitted work plan, report, or other item, or portion thereof, is disapproved in whole or in part, EPA, after consultation with FDEP, may again require Mosaic to correct any deficiencies in accordance with the preceding Paragraphs, may itself correct any

deficiencies, or may finally disapprove the submission, subject to Mosaic's right to invoke dispute resolution under Section XI (Dispute Resolution) and the right of EPA and FDEP to seek stipulated penalties as provided in the preceding Paragraphs. If the re-submission is approved or corrected in whole or in part, Mosaic shall proceed in accordance with Paragraph 27.

32. Correction of Non-Compliance.

(a) If Mosaic determines, with or without notice from EPA and/or FDEP, that it is violating, or will violate, any requirement of Section V (Compliance Requirements) of this Consent Decree, other than those set forth in Paragraphs 15(f) (temporary storage of First Saleable Product) and 25 (Financial Assurance), Mosaic shall submit with its report of the violation, pursuant to Section VIII (Reporting Requirements) of this Consent Decree, and shall subsequently implement, a Correction Plan to rectify the violation, if it has not already corrected the violation by the time of the report. The Correction Plan shall include a schedule for correcting the violation.

(b) In the event of a violation subject to Paragraph 32(a), Mosaic nevertheless shall be considered to be in compliance with this Consent Decree for purposes of: (1) continuing to manage those wastes that Paragraphs 15 through 18 allow to be input to Upstream Operations or Downstream Operations or managed in Recovery Units or together with Bevill-Exempt Wastes or transferred among Mosaic's Florida Facilities; and (2) assessing Mosaic's compliance with this Consent Decree under Paragraphs 34, 79, 80 and 81 of this Consent Decree, provided that:

(1) Mosaic deposits wastes governed by Paragraphs 15-18 only in a Phosphogypsum Stack System subject to the Stack System Requirements set forth in Paragraph 15(a); and

(2) Mosaic:

- (i) Timely implements and completes its Correction Plan; or
- (ii) Refers an allegation of non-compliance with Section V (Work Requirements) or with a Correction Plan to dispute resolution pursuant to Section XI (Dispute Resolution) and either
 - a. Prevails in the dispute resolution or
 - b. Satisfactorily complies with an EPA or judicial directive to correct any instances of non-compliance

(collectively, Continuing Compliance Criteria). Nothing in this Paragraph shall be construed as EPA approval of Mosaic's correction efforts pursuant to this Paragraph, as a waiver of stipulated penalties for the violation pursuant to Section IX (Stipulated Penalties), or as limiting the rights reserved by Plaintiffs under Section VI (Work Takeover) or Paragraph 82 of this Consent Decree. EPA reserves the right to require, upon written request, that a Correction Plan be submitted to EPA for approval in accordance with Paragraphs 27-30, above. Mosaic's compliance with this Paragraph is without prejudice to its rights under Section X (Force Majeure) and Section XI (Dispute Resolution) of this Consent Decree.

33. Permits. Where any compliance obligation under this Section requires Mosaic to obtain a federal, state, or local permit or other form of approval, Mosaic shall submit timely and complete applications and take such actions as are necessary to obtain all such permits or approvals. A request for supplementation by the permitting agency does not constitute a notice or finding that an application was incomplete for the purpose of this Paragraph unless the permitting agency determines that the original application was so deficient as to constitute a material breach of Mosaic's obligations under this Consent Decree. Mosaic may seek relief

under the provisions of Section X of this Consent Decree (Force Majeure) for any delay in the performance of any such obligation resulting from a failure to obtain, or a delay in obtaining, any permit or approval required to fulfill such obligation, if Mosaic has submitted timely and complete applications and has taken such actions as are necessary to timely obtain all such permits or approvals.

34. Provided that Mosaic remains in compliance with Section V (Compliance Requirements) or the Continuing Compliance Criteria set forth in Paragraph 32 at a Facility, that Facility shall not be required to operate as a Treatment Storage and Disposal Facility pursuant to Section 3005 of RCRA and its implementing federal and/or state regulations, with respect to:

(a) the treatment, storage, transport, management, and disposal of Bevill-Exempt Wastes that have been commingled with hazardous wastes or otherwise managed in violation of law as alleged in the Complaint:

(i) prior to the lodging of this Consent Decree,

(ii) prior to completing the compliance projects set forth in Appendix 6 (RCRA Project Narrative and Compliance Schedule) as provided by Paragraph 13, or

(iii) during timely implementation of a Correction Plan as set forth in Paragraph 32;

(b) wastes that Paragraphs 15 through 18(a) allow to be input to Upstream Operations or Downstream Operations or managed in Recovery Units or together with Bevill-Exempt Wastes; and

(c) wastes that Paragraph 18(b) allows to be transferred among Mosaic's Florida Facilities.

VI. WORK TAKEOVER

35. In the event EPA determines that Mosaic has: (a) ceased implementation of any portion of the Work; or (b) is seriously or repeatedly deficient or late in its performance of the Work; or (c) is implementing the Work in a manner that may cause an endangerment to human health or the environment, EPA, after consultation with FDEP and with the joint approval of the EPA Region 4 Regional Administrator and the Assistant Administrator for the EPA Office of Enforcement and Compliance Assurance, may issue a written notice (Work Takeover Notice) to Mosaic. Any Work Takeover Notice issued by EPA shall specify the grounds upon which such notice was issued and shall provide Mosaic a period of thirty (30) Days within which to remedy the circumstances giving rise to EPA's issuance of such notice.

36. If, after expiration of the thirty (30) Day period specified in Paragraph 35 of this Section, the Work Takeover Notice has not been withdrawn by EPA and Mosaic has not remedied to EPA's satisfaction the circumstances giving rise to EPA's issuance of the Work Takeover Notice, EPA at any time thereafter may undertake Work Takeover by: (a) assuming and/or directing the performance of; (b) seeking the appointment of a receiver to direct the performance of; or (c) only with the concurrence of FDEP, accessing Financial Assurance to finance the performance of all or any portions of the Work that EPA deems necessary to correct the violations or conditions that triggered the Work Takeover Notice pursuant to Paragraph 35 (Work Takeover). EPA shall notify Mosaic in writing (which writing may be electronic) if EPA determines that implementation of a Work Takeover is warranted under this Section of the Consent Decree. In the event that EPA seeks to appoint a receiver to direct the performance of the Work, Mosaic shall not oppose such appointment on grounds other than lack of competence or conflict of interest, but shall retain its right to challenge the underlying Work Takeover in

Dispute Resolution, as set forth in the following Paragraph and Section XI (Dispute Resolution) of this Consent Decree. In implementing any Work Takeover, EPA shall make reasonable efforts not to interfere with Facility operations not directly affected by the conditions that triggered the Work Takeover.

37. In the event that Mosaic invokes Section XI (Dispute Resolution) of the Consent Decree with respect to EPA's Work Takeover and/or its selection of options set forth in Paragraph 36 (which must be disputed together with the underlying Work Takeover and pursuant to Paragraph 70(a) of this Consent Decree), EPA during the pendency of any such dispute may, in its unreviewable discretion, commence and continue a Work Takeover until the earlier of: (a) the date that Mosaic remedies, to EPA's satisfaction, the circumstances giving rise to issuance of the Work Takeover Notice; or (b) the date that a final decision is rendered in accordance with Section XI (Dispute Resolution) of the Consent Decree requiring EPA to terminate such Work Takeover.

38. After commencement and for the duration of any Work Takeover, EPA or any appointed receiver shall have immediate access to and benefit of any Financial Assurance provided pursuant to Paragraph 25 and Appendix 2 (Financial Assurance) of this Consent Decree to implement the Work. If EPA or any appointed receiver are unable to access to the Financial Assurance, or the Work addressed by the Work Takeover is not covered by Financial Assurance, then any unreimbursed costs incurred by EPA in connection with the Work Takeover shall be considered a financial obligation owed by Mosaic to the United States and collectible in an action to enforce this Consent Decree. Nothing in this Paragraph shall be construed to relieve Mosaic of its obligation to provide adequate Financial Assurance pursuant to Appendix 2. In the event that it is determined in Dispute Resolution that the Work Takeover was not warranted, any

unexpended funds in a Stand-by Trust that originated from a letter of credit, surety bond or corporate guarantee shall be used to restore any pre-existing Trust Fund to the pre-Work Takeover level, if necessary, and any balance of unexpended funds shall be released and used to re-establish the original financial mechanism(s).

VII. SUPPLEMENTAL ENVIRONMENTAL PROJECT

39. FDEP and Mosaic have agreed on a Supplemental Environmental Project (“SEP”) as described herein in Appendix 9. Mosaic, under the oversight of FDEP, shall remediate seepage breakout at the Mulberry Facility South Cooling Pond as further described in Appendix 9, and subject to the following conditions:

(a) The cost of the SEP shall be based on direct expenditures for engineering services, materials, and for other third-party contractors or vendors, where needed to perform the SEP (the “Applicable SEP Costs”). Mosaic shall complete the SEP work described herein in Appendix 9, to the extent the Applicable SEP Costs do not exceed \$1.2 Million.

(b) Remediation shall continue to be performed by Mosaic until performance in full has been completed as described in Appendix 9.

(c) If Mosaic determines that the costs of the SEP will or are likely to exceed \$1.2 million in Applicable SEP Costs as a result of an “Unanticipated Event” or “Differing Site Condition,” Mosaic shall immediately so inform FDEP and suspend work and, to the extent feasible, do so prior to incurring Applicable SEP Costs in excess of \$1.2 million. For the purposes of this paragraph, “Unanticipated Event” or “Differing Site Condition,” shall mean concealed or latent physical conditions or subsurface conditions at a portion of the site corresponding to the SEP work that (i) materially differ from the conditions described in Appendix 9 or (ii) are of an unusual nature, differing materially from the conditions ordinarily

encountered and generally recognized as inherent in the applicable SEP work. Following notice that performance of the SEP will exceed the above threshold, FDEP may either: (i) require a modification to the SEP to allow the Applicable SEP Costs to not exceed \$1.2 million, or (ii) reach an agreement with Mosaic on any additional funds and the source of such funds that may be used to fund all or some portion of the Applicable SEP Costs in excess of \$1.2 million.

(d) If Mosaic fails to timely submit the notification of completion, or otherwise fails to complete the SEP within the timeframes provided in Paragraph 39(b), or if upon review of the certification of construction completion, FDEP determines that the project cannot be accepted due to a substantially incomplete certification of completion or due to substantial deviations from the approved SEP, Mosaic will be notified, in writing, of the reason(s) that prevent the acceptance of the project. Mosaic shall address all of the matters identified by FDEP that are inconsistent with the SEP described in Appendix 9, or the timeframes herein required, and submit a new certification of completion within 45 Days of receipt of FDEP's notice, unless such FDEP notice specifies a greater period of time for submittal of a new certification of completion. If Mosaic, despite its best efforts to do so, fails to complete the SEP or if upon review of the new submittal, FDEP determines that the SEP is still incomplete or not in accordance with the SEP described in Appendix 9, Mosaic shall pay a stipulated penalty to FDEP equal to the greater of: (i) \$1.2 Million (less the costs that Mosaic incurred on the SEP up to a maximum of \$1.2 Million), or (ii) \$25,000.

VIII. REPORTING REQUIREMENTS

40. If Mosaic determines that it has violated or will violate, any requirement of this Consent Decree, Mosaic shall (unless otherwise directed by EPA or FDEP) notify EPA and FDEP of such violation and its likely duration, in writing, within twelve (12) Days of the date Mosaic first becomes aware of the violation, with an explanation of the likely cause of the violation and of the remedial steps taken, or to be taken, to prevent or minimize such violation. If the cause of a violation cannot be fully explained at the time the report is due, Mosaic shall so state in the report. Mosaic shall investigate the cause of the violation and shall then submit an amendment to the report, including a full explanation of any identifiable cause(s) of the violation, within thirty (30) Days of the date Mosaic becomes aware of the violation. Nothing in this Paragraph or Paragraphs 41 and 42 relieves Mosaic of its obligation to provide the notice required by Section X of this Consent Decree (Force Majeure).

41. Periodic Reporting

(a) Within forty-five (45) Days after the end of each calendar-quarter after lodging of this Consent Decree (quarters shall be calculated based on Mosaic's December 31st end-of-fiscal-year), until the quarter ending after the completion of the final compliance project identified in Appendix 6, Mosaic shall submit to EPA and FDEP a report for each Operating Facility for the preceding calendar quarter, that shall include (a) the status of any construction or compliance measures described in Appendix 6 and the applicable Facility Report for each Operating Facility; (b) completion of milestones set forth in Appendix 6; (c) problems encountered or anticipated, together with implemented or proposed solutions, with projects described in Appendix 6 and in the applicable Facility Report for each Operating Facility; (d) status of permit applications for projects described in Appendix 6; (e) status of plans for closure

and long-term care and status of permit application, as applicable, for closure or long-term care; (f) operation and maintenance difficulties or concerns relating to wastes managed pursuant to Paragraphs 15 – 18, or projects described in Appendix 6; (g) status of Financial Assurance; (h) a discussion of Mosaic's progress in satisfying its obligations in connection with the SEP under Section VII of this Consent Decree, including, at a minimum, a narrative description of activities undertaken and the status of any construction or compliance measures; (i) a description of any violation of the requirements of this Consent Decree reported under Paragraph 40 and an explanation of the likely cause of such violation and of the remedial steps taken, or to be taken, to prevent or minimize such violation; (j) the log of any temporary use of units in Upstream Operations, Mixed-Use Units or Grandfathered Units for the storage of the First Saleable Product, (k) the log of spills and leaks tracked pursuant to the BMP set forth in Appendix 5, and (l) identification of any confirmed "critical condition," as defined and reported to FDEP and/or EPA pursuant to Appendix 1.

(b) Thereafter, and for a period of two (2) years, Mosaic shall submit such reports to Plaintiffs for each Operating Facility on a semi-annual basis. Thereafter Mosaic shall submit such reports annually until such time as Mosaic submits the Closure Application for an Operating Facility pursuant to Appendix 1 Attachment D (Closure of Phosphogypsum Stacks/ Stack Systems). Mosaic shall submit its next report within one-hundred-eighty (180) Days after the submission of the Closure Application, and annually thereafter until this Consent Decree is terminated with respect to that Operating Facility.

(c) Following completion of the compliance projects "Big Holding Tank and Wash Solution System in Phosphoric Acid Plant" and "Granulation Wash Reconfiguration," in Appendix 6 (RCRA Project Narrative & Compliance Schedule), Mosaic shall submit to EPA and

FDEP a report for each Operating Facility within forty-five (45) Days after the end of each calendar quarter identifying any transfer(s) of GHT Effluent to the BHT during the reporting period, including the following information: (a) the date of any transfer(s); (b) the reason for the transfer; (c) the volume of the contents in the GHT when Mosaic started and ceased use of the transfer line; (d) the volume transferred; and (e) a proposal for minimizing, if possible, any reoccurrence of the non-routine event that led to the transfer. These reports shall be submitted quarterly for a period of three (3) years following project completion. Thereafter, Mosaic shall submit such reports annually until such time as Mosaic submits the Closure Application for a Facility pursuant to Appendix 1 Attachment D (Closure of Phosphogypsum Stacks/ Stack Systems).

(d) Within forty-five (45) Days after the end of each calendar year after lodging of this Consent Decree, Mosaic shall submit reports for each Closing Facility that shall include: (a) status of plans for closure and long-term care; and (b) identification of any confirmed "critical condition," as defined and reported to FDEP and/or EPA pursuant to Appendix 1.

42. Whenever any violation of this Consent Decree, or any other event affecting Mosaic's performance under this Consent Decree or the performance of its Facility may pose an immediate threat to the public health or welfare or the environment, Mosaic shall, unless otherwise directed, notify EPA and FDEP in Section XV (Notices), orally or by electronic or facsimile transmission as soon as possible, but no later than twenty-four (24) hours after Mosaic first knew of the event, and shall comply with the requirements of Appendix 1, Attachment E (Critical Conditions and Temporary Measures). Any violation of this notice requirement shall be deemed to terminate on the Day that both Plaintiffs have received actual notice of the violation

or event from Mosaic or by other means. This notice requirement does not relieve Mosaic of its obligation to comply with any federal and state laws applicable to the violation or event. This notice requirement is in addition to the requirement to provide notice of a violation of this Consent Decree set forth in the preceding Paragraph.

43. All reports shall be submitted to the persons designated to receive Notices for Plaintiffs in Section XV (Notices) of this Consent Decree. All notices and submittals to “EPA and/or FDEP” under this Consent Decree (including Appendices), other than those required by this Section or that are submitted for approval pursuant to Paragraphs 27-29, may be submitted to FDEP only, provided that a copy of the cover letter identifying the notice or submittal is also sent to EPA. Mosaic also shall supply EPA with a copy of such notice(s) or submittal(s) upon request by EPA.

44. Each report submitted by Mosaic under this Section shall be signed by a responsible corporate official of Mosaic (as defined in 40 C.F.R. § 270.11(a)) and shall include the following certification:

I certify under penalty of law that this document and all attachments were prepared under my direction or supervision in accordance with a system designed to assure that qualified personnel properly gather and evaluate the information submitted. Based on my inquiry of the person or persons who manage the system, or those persons directly responsible for gathering the information, the information submitted is, to the best of my knowledge and belief, true, accurate, and complete. I am aware that there are significant penalties for submitting false information, including the possibility of fine and imprisonment for knowing violations.

This certification requirement does not apply to emergency notifications where compliance would be impractical.

45. The reporting requirements of this Consent Decree do not relieve Mosaic of any reporting obligations required by the RCRA Requirements or by any other federal, state, or local

law, regulation, permit, or other requirement. However, the reporting requirements of this Consent Decree shall not require Mosaic to re-submit any report, plan or information submitted by Mosaic to EPA and/or FDEP prior to the Effective Date of this Consent Decree.

46. Any information provided pursuant to this Consent Decree may be used by the Plaintiffs in any proceeding to enforce the provisions of this Consent Decree and as otherwise permitted by law.

IX. STIPULATED PENALTIES

47. Mosaic shall be liable for stipulated penalties to the United States and FDEP for violations of this Consent Decree as specified below, unless excused under Section X (Force Majeure). A violation includes failing to perform any obligation required by the terms of this Consent Decree, including any work plan or schedule approved under this Consent Decree, according to all applicable requirements of this Consent Decree and within the specified time schedules established by or approved under this Consent Decree.

48. Civil Penalty. If Mosaic fails to pay the civil penalty required to be paid under Section IV of this Consent Decree (Civil Penalty) when due, Mosaic shall pay a stipulated penalty of \$1,000 per Day for each Day that the payment is late for the first ten (10) Days, together with Interest. Thereafter, Mosaic shall pay \$3,000 per Day for each Day that the payment is late, with Interest. Late payment of the civil penalty shall be made in accordance with Section IV (Civil Penalty), Paragraph 10. Stipulated penalties for late payment of the civil penalty shall be paid in accordance with Paragraphs 64, 65, 67 and 68, below. All transmittal correspondence shall state that any such payment is for late payment of the civil penalty due under this Consent Decree, or for stipulated penalties for late payment, as applicable, and shall include the identifying information set forth in Paragraph 10, above.

49. Compliance Requirements. The following stipulated penalties shall accrue per violation per Day for each violation of the requirements identified in Section V (Compliance Requirements):

<u>Penalty Per Violation Per Day</u>	<u>Period of Noncompliance</u>
\$1,000	1st through 14th Day
\$2,000	15th through 30th Day
\$3,000	31st Day and beyond

Stipulated penalties shall not apply to spills and leaks of products and wastes that are managed in compliance with the approved BMP set forth in Appendix 5.

50. Reporting Requirements. The following stipulated penalties shall accrue per violation per Day for each violation of the requirements of Section VIII of this Consent Decree (Reporting Requirements):

<u>Penalty Per Violation Per Day</u>	<u>Period of Noncompliance</u>
\$750	1st through 14th Day
\$1,000	15th through 30th Day
\$2,000	31st Day and beyond

51. Subject to the provisions of Paragraph 30, above, and except as otherwise specified in Paragraphs 54(b), stipulated penalties under this Section shall begin to accrue on the Day after performance is due or on the Day a violation occurs, whichever is applicable, and shall continue to accrue until performance is satisfactorily completed or until the violation ceases. Stipulated penalties shall accrue simultaneously for separate violations of this Consent Decree.

52. Mosaic shall pay stipulated penalties to the United States and to FDEP within twelve (12) Days of a written demand by either Plaintiff, subject to its right to invoke dispute

resolution in accordance with Section XI (Dispute Resolution). Except as provided in Paragraph 39(d), Mosaic shall pay fifty percent (50%) of the total stipulated penalty amount due to the United States and fifty percent (50%) to FDEP. The Plaintiff making a demand for payment of a stipulated penalty shall simultaneously send a copy of the demand to the other Plaintiff.

53. Each Plaintiff, may, in the unreviewable exercise of its discretion, reduce or waive stipulated penalties otherwise due to it under this Consent Decree. The determination by one Plaintiff not to seek stipulated penalties, or to subsequently waive or reduce the amount it seeks, shall not preclude the other Plaintiff from seeking the full amount of the stipulated penalties owed.

54. Stipulated penalties shall continue to accrue as provided in Paragraph 51, during any Dispute Resolution, but need not be paid until the following:

a. If the dispute is resolved by agreement or by a decision of the United States or FDEP that is not subject to judicial review or appealed to the Court, Mosaic shall pay accrued penalties determined to be owing, together with Interest, to the United States or FDEP within thirty (30) Days of the effective date of the agreement or the receipt of the United States' or FDEP's decision or order.

b. If the dispute is appealed to the Court and the United States or FDEP prevails in whole or in part, Mosaic shall pay all accrued penalties determined by the Court to be owing, together with Interest, within sixty (60) Days of receiving the final Court decision.

55. Mosaic shall pay stipulated penalties owing to the United States in the manner set forth and with the confirmation notices required by Paragraph 10, except that the transmittal letter shall state that the payment is for stipulated penalties and shall state for which violation(s) the penalties are being paid. Mosaic shall pay stipulated penalties owing to FDEP in accordance

with Paragraph 11, except that the transmittal letter shall state that the payment is for stipulated penalties and shall state for which violation(s) the penalties are being paid.

56. Mosaic shall not deduct stipulated penalties paid under this Section in calculating its state and federal income tax.

57. If Mosaic fails to pay stipulated penalties according to the terms of this Consent Decree, Mosaic shall be liable for Interest on such penalties, as provided for in 28 U.S.C. § 1961, accruing as of the date payment became due. Nothing in this Paragraph shall be construed to limit the United States or FDEP from seeking any remedy otherwise provided by law for Mosaic's failure to pay any stipulated penalties.

58. Subject to the provisions of Section XIII (Effect of Settlement/ Reservation of Rights) of this Consent Decree, the stipulated penalties provided for in this Consent Decree shall be in addition to any other rights, remedies, or sanctions available to the United States or FDEP for Mosaic's violation of this Consent Decree or applicable law. Where a violation of this Consent Decree is also a violation of relevant statutory or regulatory requirements, Mosaic shall be allowed a credit for any stipulated penalties paid against any statutory penalties imposed for such violation.

X. FORCE MAJEURE

59. Force majeure, for purposes of this Consent Decree, is defined as any event arising from causes beyond the control of Mosaic, of any entity controlled by Mosaic, or of Mosaic's contractors, that delays or prevents the performance of any obligation under this Consent Decree despite Mosaic's best efforts to fulfill the obligation. The requirement that Mosaic exercise best efforts to fulfill the obligation includes using best efforts to anticipate any potential force majeure and best efforts to address the effects of any potential force majeure

(1) as it is occurring and (2) following the potential force majeure such that the delay and any adverse effects of the delay are minimized to the greatest extent possible. Force majeure does not include Mosaic's financial inability to perform any obligation under this Consent Decree.

60. If any event occurs or has occurred that may delay the performance of any obligation under this Consent Decree, whether or not caused by a force majeure event, Mosaic shall provide notice orally or by electronic or facsimile transmission as soon as possible, as provided in Section XV (Notices) of this Consent Decree, but not later than seven (7) Days after the time when Mosaic first knew that the event might cause a delay. Within ten (10) Days thereafter, Mosaic shall provide written notice to EPA and FDEP with an explanation and description of the reasons for the delay; the anticipated duration of the delay; all actions taken or to be taken to prevent or minimize the delay; a schedule for implementation of any measures to be taken to prevent or mitigate the delay or the effect of the delay; Mosaic's rationale for attributing such delay to a force majeure event if it intends to assert such a claim; and a statement as to whether, in the opinion of Mosaic, such event may cause or contribute to an endangerment to public health, welfare or the environment. Mosaic shall include with any notice all available documentation supporting a claim that the delay was attributable to a force majeure event. Mosaic shall be deemed to know of any circumstance of which Mosaic, any entity controlled by Mosaic, or Mosaic's contractors knew or reasonably should have known. Failure to comply with the above requirements regarding an event shall preclude Mosaic from asserting any claim of force majeure regarding that event, provided, however, that if EPA, despite the late notice, is able to assess to its satisfaction whether the event is a force majeure under Paragraph 59 and whether Mosaic has exercised its best efforts under Paragraph 60, EPA may, in its

unreviewable discretion, excuse in writing Mosaic's failure to submit timely notices under this Paragraph.

61. If EPA, after consultation with FDEP, agrees that the delay or anticipated delay is attributable to a force majeure event, the time for performance of the obligations under this Consent Decree that are affected by the force majeure event will be extended by EPA, after consultation with FDEP, for such time as is necessary to complete those obligations.

An extension of the time for performance of the obligations affected by the force majeure event shall not, of itself, extend the time for performance of any other obligation. If EPA, after consultation with FDEP, agrees that the delay is attributable to a force majeure event, EPA will notify Mosaic in writing of the length of the extension, if any, for performance of the obligations affected by the force majeure event.

62. If EPA, after consultation with FDEP, does not agree that the delay or anticipated delay has been or will be caused by a force majeure event, EPA will notify Mosaic in writing of its decision.

63. If Mosaic elects to invoke the dispute resolution procedures set forth in Section XI (Dispute Resolution), it shall do so no later than fifteen (15) Days after receipt of EPA's notice. In any such proceeding, Mosaic shall have the burden of demonstrating by a preponderance of the evidence that the delay or anticipated delay has been or will be caused by a force majeure event, that the duration of the delay or the extension sought was or will be warranted under the circumstances, that best efforts were exercised to avoid and mitigate the effects of the delay, and that Mosaic complied with the requirements of Paragraphs 59 and 60, above. If Mosaic carries this burden, the delay at issue shall not be a violation by Mosaic of the affected obligation of this Consent Decree identified to EPA and the Court.

XI. DISPUTE RESOLUTION

64. Unless otherwise expressly provided for in this Consent Decree, the dispute resolution procedures of this Section shall be the exclusive mechanism to resolve all disputes arising under or with respect to this Consent Decree. Mosaic's failure to seek resolution of a disputed issue under this Section shall preclude Mosaic from raising any such issue as a defense to an action by the United States or FDEP to enforce any obligation of Mosaic arising under this Consent Decree.

65. Informal Dispute Resolution. Any dispute subject to Dispute Resolution under this Consent Decree shall first be the subject of informal negotiations, which may include any third-party assisted, non-binding alternative dispute resolution process agreeable to the Parties. Mosaic shall submit a written Notice of Dispute to both the United States and FDEP within thirty (30) Days after receiving written notice from EPA (or FDEP with respect to Section VII (Supplemental Environmental Projects)) of a decision that Mosaic disputes. The dispute shall be considered to have arisen on the later of the dates that the United States or FDEP receives a written Notice of Dispute. Such Notice of Dispute shall state clearly the matter in dispute. The period of informal negotiations shall not exceed twenty (20) Days from the date that the dispute arises, unless that period is modified by written agreement between the United States (or FDEP with respect to Section VII (Supplemental Environmental Projects)) and Mosaic. If the Parties cannot resolve a dispute by informal negotiations, then the position of EPA, after consultation with FDEP, or of FDEP with respect to Section VII (Supplemental Environmental Projects), shall be considered binding, unless Mosaic invokes formal dispute resolution procedures as provided in the following Paragraph.

66. Formal Dispute Resolution. If Mosaic elects to invoke formal dispute resolution, Mosaic shall, within thirty (30) Days after the conclusion of the informal negotiation period, submit to EPA and FDEP, or of FDEP with respect to Section VII (Supplemental Environmental Projects, a written Statement of Position regarding the matter in dispute. The Statement of Position shall include, but need not be limited to, any factual data, analysis, or opinion supporting Mosaic's position and any supporting documentation relied upon by Mosaic.

67. EPA, after consultation with FDEP, or FDEP with respect to Section VII (Supplemental Environmental Projects), shall submit its Statement of Position within forty-five (45) Days of receipt of Mosaic's Statement of Position. The EPA or FDEP Statement of Position shall include or clearly reference, but need not be limited to, any factual data, analysis, or opinion supporting that position and any supporting documentation relied upon by EPA or FDEP. Where appropriate, EPA (or FDEP with respect to Section VII (Supplemental Environmental Projects)) may allow submission of supplemental statements of position by the Parties to the dispute. The EPA or FDEP Statement of Position shall be binding on Mosaic unless Mosaic files a motion for judicial review of the dispute in accordance with the following Paragraph.

68. Mosaic may seek judicial review of the dispute by filing with the Court and serving on the United States and FDEP, in accordance with Section XV (Notices) of this Consent Decree, a motion requesting judicial resolution of the dispute. The motion must be filed within thirty (30) Days of receipt of EPA's Statement of Position pursuant to the preceding Paragraph. The motion shall contain a written statement of Mosaic's position on the matter in dispute, including any supporting factual data, analysis, opinion, or documentation, and shall set

forth the relief requested and any schedule within which the dispute must be resolved for orderly implementation of the Consent Decree.

69. The United States, after consultation with FDEP, or FDEP with respect to Section VII (Supplemental Environmental Projects), shall respond to Mosaic's motion within the time period allowed by the Local Rules of this Court. Mosaic may file a reply memorandum to the extent permitted by the Local Rules.

70. Standard of Review

a. Disputes Concerning Matters Accorded Record Review. In any dispute brought under this Section pertaining to the adequacy or appropriateness of plans, procedures to implement plans, schedules or any other items requiring approval by EPA under this Consent Decree; the adequacy of the Work performed pursuant to this Consent Decree; and all other disputes that are accorded review on the administrative record under applicable principles of administrative law, EPA shall compile an administrative record of the dispute containing all Statements of Position, including supporting documentation and referenced data or information, and Mosaic shall have the burden of demonstrating, based on the administrative record, that the position of the United States is arbitrary and capricious or otherwise not in accordance with law.

b. In any other dispute brought under this Section, Mosaic shall bear the burden of demonstrating that its position complies with and furthers the objectives of this Consent Decree.

71. The invocation of dispute resolution procedures under this Section shall not, by itself, extend, postpone, or affect in any way any obligation of Mosaic under this Consent Decree, unless and until final resolution of the dispute so provides or unless ordered by the Court. Stipulated penalties with respect to the disputed matter shall continue to accrue from the

first Day of noncompliance, but payment shall be stayed pending resolution of the dispute as provided in Paragraph 54. If Mosaic does not prevail on the disputed issue, stipulated penalties shall be assessed and paid as provided in Section IX (Stipulated Penalties).

XII. INFORMATION COLLECTION AND RETENTION

72. The United States, FDEP, and their representatives, including attorneys, contractors, and consultants, shall have the right of entry into any of Mosaic's Florida Facilities, at all reasonable times, upon presentation of appropriate identification, to:

- a. monitor the progress of activities required under this Consent Decree;
- b. verify any data or information submitted to the United States or FDEP in accordance with the terms of this Consent Decree;
- c. obtain samples and, upon request, splits of any samples taken by Mosaic or its representatives, contractors, or consultants;
- d. obtain documentary evidence, including photographs and similar data;
- e. assess Mosaic's compliance with this Consent Decree; and
- f. conduct, direct or review Work pursuant to Section VI (Work Takeover) of this Consent Decree.

73. Upon request, Mosaic shall provide EPA, FDEP and their authorized representatives splits of any samples taken by Mosaic. Upon request, EPA and FDEP and their authorized representatives shall provide Mosaic splits of any samples taken by EPA, FDEP, and their authorized representatives.

74. Mosaic shall retain, and shall require its contractors and agents to preserve, all non-identical copies of all documents, records, or other information (including documents, records, emails or other information in electronic form and including any documents, records,

data or other information underlying the submission of any Report required pursuant to Section VIII (Reporting Requirements)) in its or its contractors or agents possession or control, or that come into its or its contractors' or agents' possession or control and that relate to Mosaic's performance of its obligations under this Consent Decree or adherence to the requirements associated with the management of waste materials allowed under Paragraphs 15 through 18 for a period of five (5) years after the creation of such documents, records or other information. This information-retention requirement shall apply regardless of any contrary corporate or institutional policies or procedures. At any time during this information-retention period, upon request by the United States or FDEP, Mosaic shall provide copies of any documents, records, or other information required to be maintained under this Paragraph.

75. At the conclusion of the information-retention period provided in the preceding Paragraph, Mosaic shall notify the United States and FDEP at least ninety (90) Days prior to the destruction of any documents, records, or other information subject to the requirements of the preceding Paragraph and, upon request by the United States or FDEP, Mosaic shall deliver any such documents, records, or other information to EPA or FDEP. Mosaic shall not dispose of materials following the expiration of its five (5) year retention period more often than once a year.

76. In connection with any request for documents, records, or other information pursuant to this Consent Decree, Mosaic may assert that certain documents, records, or other information are privileged under the attorney-client privilege or any other privilege recognized by federal law, provided that Mosaic shall not assert a legal privilege for any data, records or information (excluding legal advice) generated or received in connection with Mosaic's obligations pursuant to the requirements of this Consent Decree. If Mosaic asserts a privilege, it

shall provide the following: (1) the title of the document, record, or information; (2) the date of the document, record, or information; (3) the name and title of each author of the document, record, or information; (4) the name and title of each addressee and recipient; (5) a description of the subject of the document, record, or information; and (6) the privilege asserted by Mosaic.

If Plaintiffs and Mosaic disagree as to whether a particular document or record is privileged, Mosaic shall deliver such document or record to the United States or the FDEP unless it invokes dispute resolution pursuant to Section XI (Dispute Resolution), in which case, Mosaic shall not have an obligation to deliver such document or record until a final determination is made, pursuant to the procedures set forth in Section XI (Dispute Resolution), that such document or record is not privileged.

77. Mosaic may also assert that information provided pursuant to this Consent Decree is protected as Confidential Business Information (CBI) under the criteria and procedures set forth in 40 C.F.R. Part 2, provided that: (a) Mosaic shall not assert a CBI claim with respect to any physical, sampling, monitoring, or analytical data other than data related to: (i) development of new or modified products; (ii) development of new or modified production processes; (iii) production materials or analyses collected for quality control or other manufacturing purposes; or (iv) analyses undertaken for competitive business purposes; and (b) Mosaic shall not assert a CBI claim for Financial Assurance information required to be provided pursuant to Paragraphs 10.e, 15.(e) and 32 of Appendix 2 of this Consent Decree. If Mosaic claims any information related to Financial Assurance submissions and Cost Estimates is CBI, Mosaic shall submit two versions, one version with the CBI material redacted, and so identified in the document, which will be publicly available, and the second version will contain the CBI material.

78. This Consent Decree in no way limits or affects any right of entry and inspection, or any right to obtain information, held by the United States or FDEP pursuant to applicable federal or state laws, regulations, or permits, nor does it limit or affect any duty or obligation of Mosaic to maintain documents, records, or other information imposed by applicable federal or state laws, regulations, or permits.

XIII. EFFECT OF SETTLEMENT/RESERVATION OF RIGHTS

79. This Consent Decree resolves the civil claims of the United States and FDEP against Mosaic, and, as to any liability arising out of Mosaic's liability only, The Mosaic Company, for the violations at the Facilities alleged in the Complaint filed in this action through the date of the lodging of the Consent Decree. This Consent Decree also resolves such claims, if any, of the United States and FDEP against the corporate officers, directors, and employees, acting in their capacities as such, of Mosaic or The Mosaic Company, but only as to liability arising out of Mosaic's liability. For continuing violations alleged in the Complaint, provided that Mosaic complies with this Consent Decree at a Facility, as set forth in Paragraph 81, from the date of lodging of the Consent Decree through its Effective Date, these claims shall also be resolved through the Effective Date of this Consent Decree, as of the Effective Date, for that Facility; and, provided that Mosaic complies with the Consent Decree at a Facility from the Effective Date of this Consent Decree through the date of termination of this Consent Decree for that Facility pursuant to Section XIX (Termination), these claims shall be finally resolved as of the date the Consent Decree terminates for that Facility.

80. Provided that Mosaic is in compliance with this Consent Decree, and subject to the reservation set forth below, Plaintiffs covenant not to sue or take administrative action under

Section 3008(a) of RCRA, 42 U.S.C. § 6928(a), or its state counterpart, seeking to require Mosaic's Facilities to comply with the RCRA Requirements, with respect to: (a) the generation, treatment, storage, transport, management, and disposal of Bevill-Exempt Wastes that have been commingled with hazardous wastes or otherwise managed in violation of law as alleged in the Complaint, and that are resolved in accordance with Paragraph 79; and (b) wastes that Paragraph 15-18 of this Consent Decree allow to be input to Upstream Operations or Downstream Operations or managed in Recovery Units or with Bevill-Exempt Wastes or transferred among Mosaic's Florida Facilities. Nothing in this Paragraph, however, shall affect Plaintiffs' rights to determine and require necessary Corrective Action Work in accordance with Paragraphs 20 and 23 of this Consent Decree, or to restrict Non-CD Corrective Action that may be required at a Facility pursuant to Plaintiffs' residual authorities under federal, state, and local laws.

81. The resolution under this Section XIII (Effect of Settlement/Reservation of Rights) of the Plaintiffs' civil claims set forth in the Complaint and the Plaintiffs' covenants not to sue are expressly conditioned upon Mosaic's timely and satisfactory compliance with the requirements of this Consent Decree. For the purposes of this Paragraph (and Paragraphs 79 and 80), and with respect to those wastes that Paragraphs 15 through 18 allow to be input to Upstream Operations or Downstream Operations, managed in Recovery Units or together with Bevill-Exempt Wastes, or transferred among Mosaic's Florida Facilities, compliance with the Continuing Compliance Criteria set forth in Paragraph 32 constitutes compliance with this Consent Decree.

82. The United States and FDEP reserve all legal and equitable remedies available to enforce the provisions of this Consent Decree, and Mosaic reserves all legal and equitable defenses available to it in the defense of any such enforcement. This Consent Decree shall not

be construed to limit the rights of the United States or FDEP to obtain penalties or injunctive relief under the federal and state environmental statutes or their implementing regulations, or under other federal or state law, regulations, or permit conditions, including Section 3008(h) of RCRA, 42 U.S.C. § 6928(h), except as expressly specified in Paragraphs 79 and 80, and Mosaic in any such action shall not assert any defense based upon the contention that such claims raised by the Plaintiffs were or should have been brought in the instant case under principles of waiver, res judicata, collateral estoppel, issue preclusion, claim preclusion, claim-splitting, or other such defense. The United States and FDEP further retain all authority and reserve all rights to take any and all actions authorized by law to protect human health and the environment, including Corrective Action Work and Non-CD Corrective Action, and all legal and equitable remedies to address any imminent and substantial endangerment to the public health or welfare or the environment arising at, or posed by, Mosaic's Facilities, whether related to the violations addressed in this Consent Decree or otherwise.

83. This Consent Decree is not a permit, or a modification of any permit, under any federal, State, or local law or regulation. While this Consent Decree resolves the Parties' dispute regarding the violations alleged in the Complaint as set forth in Paragraph 79, compliance with the terms of this Consent Decree does not guarantee compliance with all applicable federal, state, or local laws or regulations. Except as provided in Paragraphs 34, 79 and 80 of this Consent Decree, Mosaic is not relieved of its obligation to achieve and maintain compliance with all applicable federal, State, and local laws, regulations, and permits; Mosaic's compliance with this Consent Decree shall be no defense to any action commenced by Plaintiffs pursuant to any such law, regulation, or permit, except as expressly specified in Paragraphs 34, 79 and 80.

84. This Consent Decree does not limit or affect the rights of the Parties against any third-parties (persons not a Party to this Consent Decree), nor does it limit the rights of third-parties except as otherwise provided by the doctrine of federal preemption or by other applicable principles of law or precedent.

85. This Consent Decree shall not be construed to create rights or obligations in, or grant any cause of action to, any third-party.

86. Nothing in the Complaint filed in this action or in this Consent Decree, including the execution and implementation of this Consent Decree, shall constitute an admission by Mosaic of any violation of the RCRA Requirements or of any of the allegations of the Complaint. Mosaic reserves all rights to dispute the factual and legal representations of the Complaint and Consent Decree except in an action to enforce this Consent Decree by a Party. The terms of this Consent Decree may not be used as evidence in any litigation between the Parties except (a) pursuant to Section XI (Dispute Resolution), (b) in an action to enforce this Consent Decree, or (c) in an action by Plaintiffs in which Mosaic asserts a defense based on this Consent Decree.

XIV. COSTS

87. The Parties shall bear their own costs of this action, including attorneys' fees, except that the United States and FDEP shall be entitled to collect costs (including attorneys' fees) incurred in any action necessary to access Financial Assurance pursuant to Paragraph 26 and Appendix 2 (Financial Assurance) of this Consent Decree, or to collect any portion of the civil penalty or any stipulated penalties or other costs due under this Consent Decree but not paid by Mosaic.

XV. NOTICES

88. Unless otherwise specified herein, whenever notifications, submissions, or communications are required by this Consent Decree in accordance with Section VIII, Reporting Requirements, they shall be made electronically, unless otherwise requested by either FDEP and EPA, and addressed as follows:

To the United States:

Chief, Environmental Enforcement Section
Environment and Natural Resources Division
U.S. Department of Justice
Re: DOJ No. 90-7-1-08388

by email	by fax	by regular mail or post office express mail	by private overnight service
----------	--------	--	---------------------------------

c/o Deborah.Reyher@usdoj.gov	(202) 514-4113 or 514-0097	Box 7611 Ben Franklin Station Washington, D.C. 20044-7611	601 D Street, NW., 2nd floor Washington, D.C. 20004
---------------------------------	----------------------------------	--	--

United States Attorney for the Middle District of Florida
Middle District of Florida
400 N. Tampa Street, Suite 3200
Tampa, FL 33602
Phone: (813) 274-6000
Fax : (813) 274-6358

and to EPA, below.

To EPA:

Alan A. Annicella and Joan Redleaf Durbin
U.S. Environmental Protection Agency, Region 4
61 Forsyth Street, S.W.
Atlanta, GA 30303-8960
Phone: (404) 562-8610

Fax: (404) 562-8078
annicella.alan@epa.gov
redleaf-durbin.joan@epa.gov

Van Housman and Bethany Russell
Office of Civil Enforcement
Mail Code 2249A
U.S. Environmental Protection Agency
Clinton Building - South
1200 Pennsylvania Ave., NW
Washington, D.C. 20460
Phone: (202) 564-0143
Fax: (202) 564-0019
russell.bethany@epa.gov
housman.van@epa.gov

To FDEP:

Tim Bahr, Program Administrator
Permitting and Compliance Assistance Program
Department of Environmental Protection
2600 Blair Stone Road, MS 4560
Tallahassee, FL 32399-2400
Tim.Bahr@dep.state.fl.us

Elsa A. Potts, Administrator
Industrial Wastewater Program
Department of Environmental Protection
2600 Blair Stone Road, MS 3545
Tallahassee, FL 32399-2400
Elsa.Potts@dep.state.fl.us

-and with respect to notices pertaining to Financial Assurance:

Robert Stewart
USEPA - Region 4
Atlanta Federal Center - 11th Floor
61 Forsyth Street, SW
Atlanta, GA 30303-8960
Stewart.robertg@epa.gov

To Mosaic and The Mosaic Company:

David Jellerson
Senior Director of Environmental

Mosaic Fertilizer, LLC
13830 Circa Crossing Drive
Lithia, FL 33547

Patrick van der Voorn
The Mosaic Company on behalf of Mosaic Fertilizer, LLC
Senior Environmental Counsel
Atria Corporate Center, Suite E490
3033 Campus Drive
Plymouth, MN 55441

To Arnold & Porter LLP (Counsel for Mosaic):
Joel M. Gross
Lester Sotsky
Peggy Otum
Eric Rey
Arnold & Porter LLP
555 Twelfth Street, N.W.
Washington, DC 20004-1206

89. Any Party may, by written notice to the other Parties, change its designated notice recipient or notice address provided above.

90. Notices submitted pursuant to this Section shall be deemed submitted upon electronic transmission, unless otherwise provided in this Consent Decree or by mutual agreement of the Parties in writing.

XVI. EFFECTIVE DATE

91. The Entry Date of this Consent Decree shall be the date of a Final Order by which this Consent Decree is entered by the Court or by which a motion to enter the Consent Decree is granted, whichever occurs first, as recorded on the Court's docket. The Effective Date of this Consent Decree shall be the later of the Entry Date of this Consent Decree or the Entry Date of the Consent Decree resolving claims by the United States and the Louisiana Department of Environmental Quality against Mosaic relating to Mosaic's facilities in Louisiana. The filing or

pendency of an appeal of the Court's entry of this Consent Decree shall not stay the Effective Date, except as may be otherwise determined pursuant to Paragraph 93 (Modification).

In the event that either Consent Decree is not entered by the Court, the Parties shall jointly stipulate to stay any previously entered Consent Decree. Notwithstanding the foregoing, Mosaic hereby agrees that it shall be bound from the date of its execution of this Consent Decree to perform obligations scheduled in this Consent Decree to occur prior to the Effective Date.

XVII. RETENTION OF JURISDICTION

92. The Court shall retain jurisdiction over this case until termination of this Consent Decree for all Facilities, pursuant to Section XIX (Termination), for the purpose of resolving disputes arising under this Consent Decree (including disputes under any Trust Agreements entered pursuant hereto) or entering orders modifying this Consent Decree, pursuant to Sections XI (Dispute Resolution) and XVIII (Modification), or effectuating or enforcing compliance with the terms of this Consent Decree.

XVIII. MODIFICATION

93. The terms of this Consent Decree may be modified only by a subsequent written agreement of the Parties to this Consent Decree as set forth herein. Any modifications to the provisions of Appendices 1 through 7 hereto, and any other modifications to any other provisions of this Consent Decree that do not constitute a material change to this Consent Decree, may be made without approval by the Court upon written agreement between Mosaic and the United States, after consultation with FDEP. Any modifications to the provisions of Appendices 8 and 9 may be made without approval by the Court upon written agreement between Mosaic and FDEP, after consultation with the United States. Any such changes shall become enforceable under this Consent Decree upon execution by Mosaic and the United States (for changes to the Consent

Decree or Appendices 1 through 7) or Mosaic and FDEP (for changes to Appendices 8 and 9), shall be made available to the public by EPA and FDEP (except to the extent such changes contain information determined to be CBI pursuant to Paragraph 77 and 40 C.F.R. Part 2,) and shall periodically be filed by EPA or FDEP with the Court. Any other modifications agreed to by the Parties shall be effective only upon approval by the Court. Except as otherwise provided in this Paragraph and Paragraph 95, a Party's refusal to agree to a modification of this Consent Decree shall be subject to dispute resolution, but a Party seeking judicial review of such a refusal shall bear the burden of demonstrating that it is entitled to the requested modification based on a significant change in factual conditions or the law or other reason that would make inequitable the continued application of the Consent Decree without the modification sought.

94. In the event that a potential transferee under Section II of this Consent Decree has agreed to become a party to this Consent Decree and subject to all its terms and provisions, it may do so upon written approval of the United States pursuant to Section II (Applicability) of this Consent Decree and Section XVIII (Modification), without further order from the Court, in which event a supplemental signature page will be affixed to this Consent Decree and filed with the Court.

XIX. TERMINATION

95. Periodic Review of Work Status. At least once every three (3) years, and more often if the Parties so agree, the Parties shall meet to review the status of the Work and to evaluate whether discrete portions of the Work have either been completed or may be accomplished and supervised under an EPA or FDEP administrative order or permit in lieu of this Consent Decree. If all Parties agree to such a modification, such agreement shall be memorialized in a written modification to this Consent Decree pursuant to Section XVIII

(Modification) and shall not require judicial approval. If the Parties agree that such modifications allow this Consent Decree to be terminated as to one or more Facilities, the Parties shall submit, for the Court's approval, a joint stipulation terminating the Consent Decree for the relevant Facilities. The Parties' inability to reach agreement under this Paragraph shall not be subject to dispute resolution or judicial review.

96. Completion of Work. Within ninety (90) Days after Mosaic concludes that all Work required under this Consent Decree has been fully performed at a Facility, EPA and/or FDEP may conduct an inspection of the Facility to be attended by EPA, FDEP and Mosaic at a mutually agreeable time. Following the inspection, and correction of any problems or deficiencies noted by EPA, after consultation with FDEP, Mosaic shall submit one or more written reports by a third-party registered professional engineer in the relevant technical field, certifying compliance with Section V (Compliance Requirements) of this Consent Decree that the Work has been completed in full satisfaction of the requirements of this Consent Decree. The reports shall indicate the case name and civil action number, and shall be submitted, together with a request for Acknowledgment of Completion, in accordance with Section VIII (Reporting Requirements) of this Consent Decree. Third-party engineer certification of any of the written reports may be waived at EPA's discretion, after consultation with FDEP.

97. If, after review of the written report(s) and certification and consultation with FDEP, EPA determines that any portion of the Work has not been completed in accordance with this Consent Decree, EPA will notify Mosaic in writing of the activity(ies) and/or obligation(s) that must be undertaken to complete the Work. EPA will set forth in the notice a schedule for performance of the activity(ies) and/or obligation(s) required under the Consent Decree, or will require Mosaic to submit a schedule for EPA approval pursuant to Section V (Compliance

Requirements) of this Consent Decree. Mosaic shall perform all activities described in the notice in accordance with the specifications and schedules established therein, subject to Mosaic's right to invoke the dispute resolution procedures set forth in Section XI (Dispute Resolution) of this Consent Decree.

98. If EPA concludes, based on the initial or any subsequent request for an Acknowledgment of Completion by Mosaic, and after reasonable opportunity for review and comment by FDEP, that the Work has been fully performed in accordance with this Consent Decree, EPA will so notify Mosaic in writing, which notice shall constitute the Acknowledgment of Completion.

99. Termination. After Mosaic has completed the requirements set forth in Paragraphs 96 and 97 of this Section, has obtained an Acknowledgment of Completion, has complied with all other requirements of this Consent Decree, and has paid the civil penalty and any accrued stipulated penalties as required by this Consent Decree, Mosaic may serve upon the United States and FDEP a Request for Termination, stating that Mosaic has satisfied those requirements, together with all necessary supporting documentation. A Request for Termination may address one or more of Mosaic's Facilities.

100. Following receipt by the United States and FDEP of Mosaic's Request for Termination, the Parties shall confer informally concerning the Request and any disagreement that the Parties may have as to whether Mosaic has satisfactorily complied with the requirements for termination of this Consent Decree. If the United States, after consultation with FDEP, agrees that the Consent Decree may be terminated for one or more Facilities, the Parties shall submit, for the Court's approval, a joint stipulation terminating the Consent Decree as to the relevant Facilities.

101. If the United States, after consultation with FDEP, does not agree that the Consent Decree may be terminated as to one or more Facilities, Mosaic may invoke Dispute Resolution under Section XI of this Consent Decree. However, all time periods and deadlines established under Section XI (Dispute Resolution) shall be extended by sixty (60) Days, or more by the agreement of the Parties.

XX. PUBLIC PARTICIPATION

102. This Consent Decree shall be lodged with the Court for a period of not less than thirty (30) Days for public notice and comment in accordance with 28 C.F.R. § 50.7. The United States reserves the right to withdraw or withhold its consent if the comments regarding the Consent Decree disclose facts or considerations indicating that the Consent Decree is inappropriate, improper, or inadequate. Mosaic and The Mosaic Company consent to entry of this Consent Decree without further notice and agree not to withdraw from or oppose entry of this Consent Decree by the Court or to challenge any provision of the Consent Decree, unless the United States has notified Mosaic in writing that it no longer supports entry of the Consent Decree.

XXI. SIGNATORIES/SERVICE

103. Each undersigned representative of Mosaic and The Mosaic Company, the Assistant Attorney General for the Environment and Natural Resources Division of the Department of Justice, or his designee, and the Secretary of the Florida Department of Environmental Protection certifies that he or she is fully authorized to enter into the terms and conditions of this Consent Decree and to execute and legally bind the Party he or she represents to this document.

104. This Consent Decree may be signed in counterparts, and its validity shall not be challenged on that basis. Mosaic and The Mosaic Company agree to accept service of process by mail with respect to all matters arising under or relating to this Consent Decree and to waive the formal service requirements set forth in Rules 4 and 5 of the Federal Rules of Civil Procedure and any applicable Local Rules of this Court including, but not limited to, service of a summons.

XXII. INTEGRATION

105. This Consent Decree and its Appendices constitute the final, complete, and exclusive agreement and understanding among the Parties with respect to the settlement embodied in the Consent Decree and supersedes all prior agreements and understandings, whether oral or written, concerning the settlement embodied herein. Other than the Appendices, which are attached to and incorporated in this Consent Decree, no other document, nor any representation, inducement, agreement, understanding, or promise, constitutes any part of this Consent Decree or the settlement it represents, nor shall it be used in construing the terms of this Consent Decree.

XXIII. FINAL JUDGMENT

106. Upon approval and entry of this Consent Decree by the Court, this Consent Decree shall constitute a final judgment of the Court as to the United States, FDEP, Mosaic and The Mosaic Company. The Court finds that there is no just reason for delay and therefore enters this judgment as a final judgment under Fed. R. Civ. P. 54 and 58.

XXIV. APPENDICES

107. The following Appendices are attached to and part of this Consent Decree:
Appendix 1 contains the following compliance requirements:

Attachment A (Site Assessment, Reporting, and Corrective Action);

Attachment B (Groundwater and Zone of Discharge Requirements);

Attachment C (Phosphogypsum Stack System Construction and Operational Requirements);

Attachment D (Closure of Phosphogypsum Stacks/Stack Systems);

Attachment E (Critical Conditions and Temporary Measures); Attachment F (Definitions for Purpose of the Consent Decree);

Attachment G (Phosphogypsum Stack System Permanent Closure Application)

Appendix 2 establishes Financial Assurance Requirements;

Attachment A (CFO Certification);

Attachment B (Annual Submittal of Phosphogypsum Stack System Closure and Long Term Care Cost Estimate);

Attachment C (Summary Annual Costs for Phosphogypsum Stack System Closure and Long Term Care ;

Attachment D (Financial Mechanisms Trust Agreement, Trust Agreement Addendum, Corporate Guarantee form, Letter of Credit form);

Attachment E ((Type B Financial Metrics Chart (Reserved)));

Attachment F (Current Configuration of Operating Facilities' Phosphogypsum Stack System and Planned Expansions);

Attachment G (Summary of Phosphogypsum Stack Volumes and Closure Areas (Reserved));

Attachment H (Guarantor's Representation and Certification form); and

Attachment I (Executed Phosphogypsum Stack System Closure and Long Term Care).

Appendix 3 is the collected Site Maps of the Mosaic Facilities;

Appendix 4 is the collected Facility Reports;

Appendix 5 is Mosaic's current BMP Plan;

Appendix 6 is the RCRA Project Narrative and Compliance Schedule;

Appendix 7 is the Alternative Liner Requirements;

Appendix 8 shows the Zones of Discharge for the Bartow, New Wales, and Riverview Facilities;

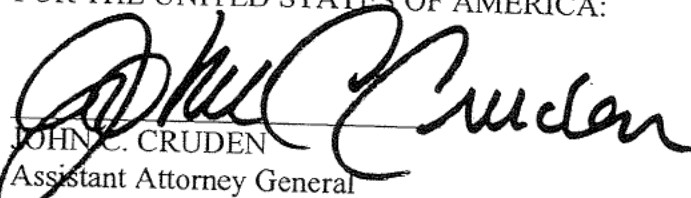
Appendix 9 contains the SEP requirements.

Dated and entered this __ day of _____, 2015.

UNITED STATES DISTRICT JUDGE
MIDDLE DISTRICT OF FLORIDA

FOR THE UNITED STATES OF AMERICA:

Date: 9/29/15


JOHN C. CRUDEN

Assistant Attorney General
Environment and Natural Resources Division
United States Department of Justice
950 Pennsylvania Avenue, NW
Washington, D.C. 20530

Date: 9/30/15


DEBORAH M. REYHER

Senior Counsel
Environmental Enforcement Section
Environment and Natural Resources Division
U.S. Department of Justice
P.O. Box 7611
Ben Franklin Station
Washington, D.C. 20044
(202) 514-4113

WE HEREBY CONSENT to the entry of the Consent Decree in United States et al. v. Mosaic Fertilizer, LLC, subject to the public notice requirements of 28 C.F.R. § 50.7.

FOR THE UNITED STATES OF AMERICA:

A. BRIAN ALBRITTON
United States Attorney
for the Middle District of FL

Randy Harwell Bar # _____
Civil Chief
Middle District of FL
400 N. Tampa Street, Suite 3200
Tampa, FL 33602
Phone: (813) 274-6000
Fax : (813) 274-6358

WE HEREBY CONSENT to the entry of the Consent Decree in United States et al. v. Mosaic Fertilizer, LLC, subject to the public notice requirements of 28 C.F.R. § 50.7.

FOR THE UNITED STATES OF AMERICA:

Date: Sept 29, 2015



CYNTHIA GILES

Assistant Administrator

Office of Enforcement and Compliance Assurance

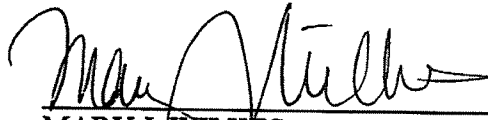
United States Environmental Protection Agency

Washington, D.C. 20460

WE HEREBY CONSENT to the entry of the Consent Decree in United States et al. v. Mosaic Fertilizer, LLC, subject to the public notice requirements of 28 C.F.R. § 50.7.

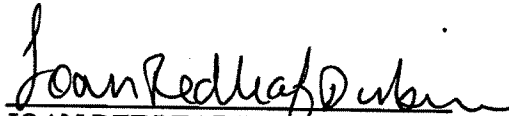
FOR THE UNITED STATES OF AMERICA:

Date: 9/28/15



MARY J. WILKES
Regional Counsel and Director
Office of Regional Counsel
U.S. Environmental Protection Agency, Region 4
61 Forsyth Street, S.W.
Atlanta, GA 30303-8960

Date: 9/28/15



JOAN REDLEAF DURBIN
Senior Attorney
Office of Regional Counsel
U.S. Environmental Protection Agency, Region 4
61 Forsyth Street, S.W.
Atlanta, GA 30303-8960

WE HEREBY CONSENT to the entry of the Consent Decree in United States et al. v. Mosaic Fertilizer, LLC, subject to the public notice requirements of 28 C.F.R. § 50.7.

FOR PLAINTIFF FLORIDA DEPARTMENT OF ENVIRONMENTAL PROTECTION:

Date: 9/29/15



PAULA L. COBB

Deputy Secretary for Regulatory Programs
Florida Department of Environmental Protection
3900 Commonwealth Blvd., M.S. 15
Tallahassee, Florida 32399

Mosaic Consent Decree – EPA Region 4 and FDEP
FOR MOSAIC FERTILIZER, LLC:

Date: _____



Mark Isaacson
Senior Vice President and Corporate Secretary
Mosaic Fertilizer, LLC

Mosaic Consent Decree – EPA Region 4 and FDEP

FOR THE MOSAIC COMPANY (as to Sections I (Jurisdiction and Venue), II (Applicability), XI (Dispute Resolution), XIII (Effect of Settlement), XV (Notices), XVI (Effective Date), XVII (Retention of Jurisdiction), XVIII (Modification), XX (Public Participation), XXI (Signatories/Service), XXII (Integration), XXIII (Final Judgment), and Paragraphs 25 and 26 (Financial Assurance)):

Date: _____

A handwritten signature in black ink, appearing to be "Mark L.", written over a horizontal line.

APPENDIX 2

APPENDIX 2: FINANCIAL ASSURANCE

This Appendix sets forth the obligations of Defendant to secure and maintain Financial Assurance, as required under Paragraph 25 of the Consent Decree, including schedules and notice requirements. Submittals requiring EPA approval shall be submitted pursuant to Section V (Compliance), Paragraphs 27-31, and Section XV (Notices) of the Consent Decree. “EPA approval” or “determination” as used in this Appendix shall encompass the approval or determination by FDEP and such approval or determination may be transmitted by either EPA or FDEP. An EPA approval or determination shall be subject to dispute resolution pursuant to Section XI (Dispute Resolution) of the Consent Decree, including judicial review, unless this Appendix specifies otherwise. The standard of review regarding any EPA approval or determination under this Appendix (including requirements incorporated by reference) shall be governed by Paragraph 70.a of the Consent Decree. If, in situations where judicial review is not precluded by this Appendix, Mosaic seeks but does not prevail on judicial review of such EPA approval or determination, Mosaic shall pay all costs incurred by the United States and FDEP in connection with such judicial review, including attorneys’ fees.

Any modification of a time period specified by this Appendix or its Attachments is a non-material modification for purposes of Section XVIII (Modification) of the Consent Decree and may be modified by written agreement of the Parties.

Under this Appendix, when required to provide an originally signed certification by the Chief Financial Officer (“CFO”), unless otherwise specified, another designated corporate officer may provide the signed certification if authority to sign has been assigned or delegated in accordance with corporate procedures and bylaws (“duly designated corporate officer”). Defendant shall use the form provided in Attachment A (“CFO Certification”) of this Appendix for this certification.

I. Definitions

Except as otherwise provided in this Appendix, definitions for the terms presented herein shall be incorporated from 40 C.F.R. § 264.141.¹ Whenever the terms set forth below are used in this Appendix, the definitions set forth below shall apply. However, the Parties are not bound by these definitions in connection with any matter not relating to Financial Assurance under this Consent Decree.

“Affiliate” shall have the same meaning as set forth in the Statement of Financial Accounting Standards No. 57, Appendix B (Glossary) (Financial Accounting Standards Board - Original Pronouncements, as amended): “A party that, directly or indirectly, through one or more intermediaries, controls, is controlled by, or is under common control with the enterprise.”

¹ Florida has promulgated financial assurance regulations by incorporating by reference 40 C.F.R. Part 264, Subpart H (including all appendices), except as otherwise provided by the Florida Administrative Code (“F.A.C.”). *See* F.A.C. R. 62-730(180)1. FDEP has incorporated by reference all federal regulations cited in this Appendix (except for some of the federal regulations specified in the definition of “Environmental Obligations”).

“Anniversary Date” shall mean the annual anniversary of the date that Financial Assurance is provided unless otherwise stated in this Appendix. The Anniversary Date for a Self-Assurance Mechanism shall be ninety (90) Days after the end of the Defendant’s fiscal year. As specified in Paragraph 29.d, the Anniversary Date for Financial Assurance provided pursuant to Paragraph 10.a.(1)(c) shall be March 31.

“Assets” shall mean all existing and all probable future economic benefits obtained or controlled by a particular entity, as represented on the company’s Independently Audited balance sheet.

“Assets located within the United States” shall mean the sum of all Assets located in the United States.

“Certified Public Accountant” or “CPA” shall mean an accountant who has demonstrated the requisite certification requirements of the American Institute of Certified Public Accountants (“AICPA”) and met all statutory and licensing requirements of the State in which (s)he works.

“Closing Facilities” shall mean Green Bay and South Pierce, as defined in Paragraph 8(f) of the Consent Decree.

“Closure Plan” shall mean the plan (including, as applicable, the Initial Closure Plan or Permanent Closure Plan) prepared for Phosphogypsum Stack System Closure, Long Term Care, and associated Water Management activities, in accordance with the requirements of Appendix 1, Attachment D or the Florida Phosphogypsum Rules, as applicable under Paragraphs 21-23 of the Consent Decree.

“Control” shall have the same meaning as set forth in the Statement of Financial Accounting Standards No. 57, Appendix B (Glossary) (Financial Accounting Standards Board - Original Pronouncements, as amended): “The possession, direct or indirect, of the power to direct or cause the direction of management and policies of an enterprise through ownership, by contract, or otherwise.”

“Corrective Action” shall have the meaning set forth in the Consent Decree.

“Corrective Action Cost Estimate” shall mean the estimate of the costs at a Facility for Plan Work as set forth in Section IV (Corrective Action) of this Appendix.

“Cost Estimate” shall mean the estimate of the costs for Phosphogypsum Stack System Closure and Long Term Care at a Facility as set forth in Section II of this Appendix.

“Current Assets” or “CA” shall mean cash or other assets or resources reasonably expected to be realized within one (1) year during the normal operating cycle of the business, as represented on the company’s Independently Audited balance sheet.

“Current Dollars” shall mean U.S. dollars in the year actually received or paid, unadjusted for price changes or inflation.

IN THE UNITED STATES DISTRICT COURT
FOR THE EASTERN DISTRICT OF LOUISIANA

UNITED STATES OF AMERICA,)	
and)	
LOUISIANA DEPARTMENT OF)	
ENVIRONMENTAL QUALITY)	
)	
Plaintiffs,)	Civil Action No. 2:15-cv-04889
)	
)	Section:
v.)	
)	Magistrate:
MOSAIC FERTILIZER, LLC,)	
)	
Defendant.)	

CONSENT DECREE

Mosaic Consent Decree – EPA Region 6 and LDEQ

TABLE OF CONTENTS

I.	JURISDICTION AND VENUE	5
II.	APPLICABILITY	6
III.	DEFINITIONS	8
IV.	CIVIL PENALTY	18
V.	COMPLIANCE REQUIREMENTS	19
VI.	WORK TAKEOVER	42
VII.	BENEFICIAL ENVIRONMENTAL PROJECTS	44
VIII.	REPORTING REQUIREMENTS	46
IX.	STIPULATED PENALTIES	50
X.	FORCE MAJEURE	54
XI.	DISPUTE RESOLUTION	56
XII.	INFORMATION COLLECTION AND RETENTION	59
XIII.	EFFECT OF SETTLEMENT/RESERVATION OF RIGHTS	62
XIV.	COSTS	66
XV.	NOTICES	68
XVI.	EFFECTIVE DATE	71
XVII.	RETENTION OF JURISDICTION	71
XVIII.	MODIFICATION	72
XIX.	TERMINATION	73
XX.	PUBLIC PARTICIPATION	75
XXI.	SIGNATORIES/SERVICE	76
XXII.	INTEGRATION	77
XXIII.	FINAL JUDGMENT	77
XXIV.	APPENDICES	78

CONSENT DECREE

WHEREAS, Plaintiffs, the United States of America (United States), on behalf of the United States Environmental Protection Agency (EPA), and the Louisiana Department of Environmental Quality (LDEQ), an agency of the State of Louisiana to which the Louisiana Legislature has delegated the power and duty to enforce the Louisiana Environmental Quality Act (EQA) and Louisiana Environmental Quality Regulations, including the authority to bring actions in courts of competent jurisdiction for violations of the EQA (La. R.S. 30:2001 et seq.) and Louisiana's Hazardous Waste Regulations (LAC 33: V. Subpart 1), (together the Plaintiffs), have filed a complaint alleging that Defendant, Mosaic Fertilizer, LLC (Mosaic) has violated the Resource Conservation and Recovery Act (RCRA), 42 United States Code (U.S.C.) § 6901 et seq., La. R.S. 30:2001 et seq, and the applicable regulations in 40 C.F.R. Parts 260-270, and LAC 33:V.Subpart 1, at its sulfuric acid, phosphoric acid and fertilizer manufacturing facilities located in Uncle Sam and Saint James, Louisiana, respectively the Uncle Sam Facility and the Faustina Facility (collectively the Facilities);

WHEREAS, the Complaint includes allegations that Mosaic failed to characterize and illegally treated, stored and disposed of hazardous waste from various processes at its Facilities, including: the production of sulfuric acid, diammonium phosphate (DAP) and monoammonium phosphate (MAP) fertilizer, and fluorosilicic acid (FSA); wastes generated during cleaning of the phosphoric acid plant and fertilizer plant equipment; and wastewaters generated from the scrubbers used to control air pollution from the phosphoric acid plants and from other chemical and waste management processes at its Facilities without a RCRA permit or interim status. The Complaint also alleges that Mosaic illegally placed hazardous wastes in the Uncle Sam Phosphogypsum Stack System dedicated for managing phosphoric acid production wastes

exempt from hazardous waste regulation pursuant to the Bevill Exemption, 40 C.F.R. § 261.4(b)(7), thus violating Sections 3004 and 3005 of RCRA, 42 U.S.C. §§ 6924-25, and the applicable regulations in 40 C.F.R. Parts 260-270, and La. R.S. 30:2001 et seq. and the applicable regulations in LAC 33:V.Subpart 1, and that those hazardous wastes remain in the Uncle Sam Phosphogypsum Stack System;

WHEREAS, Mosaic denies the applicability of Sections 3004 and 3005 of RCRA, 42 U.S.C. §§ 6924-25, and the applicable regulations in 40 C.F.R. Parts 260-270, and La. R.S. 30:2001 et seq. and the applicable regulations in LAC 33:V.Subpart 1, and the regulations promulgated thereunder to certain practices at the Mosaic Facilities that are the subject of the Complaint, denies the violations alleged in the Complaint, and maintains that it has been and remains in compliance with RCRA and is not liable for civil penalties or injunctive relief;

WHEREAS, the objective of the Parties in this Consent Decree is to resolve the civil claims alleged in the Complaint by 1) establishing certain injunctive relief and environmental projects, whereby Mosaic shall modify certain operating practices with respect to its management of hazardous wastes and Bevill-Exempt Wastes, implement environmental controls, remediation, and financial assurance, and undertake certain pollution reduction and other beneficial projects; and 2) assessing an appropriate penalty;

WHEREAS, Mosaic has conducted itself in good faith in its discussions with the Plaintiffs concerning the violations alleged in the Complaint, and has already implemented certain operational changes at its Facilities and remedial measures, obviating the need for certain injunctive relief;

WHEREAS, by agreeing to entry of this Consent Decree, Mosaic makes no admission of law or fact with respect to the allegations in the Complaint, and continues to deny any non-

compliance or violation of any law or regulation identified therein or in this Consent Decree.

For the purpose of avoiding litigation among the Parties, however, Mosaic, and where applicable

The Mosaic Company, agree to the requirements of this Consent Decree;

WHEREAS, the Parties agree that the United States' filing of the Complaint and entry into this Consent Decree constitutes diligent prosecution by the United States and LDEQ, under Section 7002(b)(1)(B) of RCRA, 42 U.S.C. § 6972(b)(1)(B), of all matters alleged in the Complaint and addressed by this Consent Decree through the date of lodging of this Consent Decree; and

WHEREAS, the Parties recognize, and the Court by entering this Consent Decree finds, that this Consent Decree has been negotiated by the Parties in good faith and will avoid litigation among the Parties and that this Consent Decree is fair, reasonable, and in the public interest.

NOW, THEREFORE, before the taking of any testimony, without the adjudication or admission of any issue of fact or law except as provided in Section I (Jurisdiction and Venue), below, and with the consent of the Parties,

IT IS HEREBY ADJUDGED, ORDERED, AND DECREED as follows:

I. JURISDICTION AND VENUE

1. This Court has jurisdiction over the subject matter of this action and over the Parties, pursuant to Section 3008(a) of RCRA, 42 U.S.C. § 6928(a), and 28 U.S.C. §§ 1331, 1332, 1345, 1355 and 1367. Venue is proper in this judicial district pursuant to 28 U.S.C. §§ 1391(b) and (c) and 1395(a), and Section 3008(a) of RCRA, 42 U.S.C. § 6928(a), because Mosaic's Facilities are located in this judicial district. For purposes of this Consent Decree, or any action to enforce this Consent Decree, the Parties consent to the Court's jurisdiction over this

Consent Decree and any such action and over Mosaic and The Mosaic Company, and further consent to venue in this judicial district.

2. Pursuant to Section 3008(a)(2) of RCRA, 42 U.S.C. § 6928(a)(2), notice of the commencement of this action has been given to LDEQ.

3. For purposes of this Consent Decree only, Mosaic agrees that the Complaint states claims upon which relief may be granted pursuant to Sections 3004 and 3005 of RCRA, 42 U.S.C. §§ 6924 and 6925, and La. R.S. 30:2001 et seq.

II. APPLICABILITY

4. The obligations of this Consent Decree apply to and are binding upon the United States, LDEQ, Mosaic, and, as provided herein, The Mosaic Company, and any successors, assigns, or other entities or persons otherwise bound by law. Rights granted to EPA under this Consent Decree may be exercised by LDEQ upon the written agreement of EPA and LDEQ with notice to Mosaic. Nothing in this Consent Decree shall apply to administrative or enforcement proceedings other than this action or an action to enforce this Consent Decree. Nor does anything in this Consent Decree relieve Mosaic of its obligation to comply with any federal and state laws applicable to activities that are not within the definition of Work in this Consent Decree.

5. No transfer of ownership or operation of all or a portion of a Facility, whether in compliance with the procedures of this Paragraph or otherwise, shall relieve Mosaic of its obligation to ensure that the terms of this Consent Decree are implemented, unless: (1) the transferee agrees in writing to undertake the obligations required by this Consent Decree and to be substituted for Mosaic as a Party to the Consent Decree and thus be bound by the terms thereof; and (2) the United States, after consultation with LDEQ, consents in writing to relieve Mosaic and the Mosaic Company of their respective obligations under this Consent Decree

pursuant to Section XVIII (Modification) of this Consent Decree. At least thirty (30) Days prior to a proposed transfer of Mosaic's obligations under this Consent Decree, or such other period agreed to by the Parties in writing: (i) Mosaic shall provide a copy of this Consent Decree to the proposed transferee, if not previously provided; and (ii) shall provide written notice of the prospective transfer, together with a copy of the proposed written agreement (subject to Paragraphs 82 and 83 of this Consent Decree and as may otherwise be agreed in writing) transferring obligations to the transferee, to EPA, LDEQ, the United States Attorney for the Eastern District of Louisiana, and the United States Department of Justice, in accordance with Section XV (Notices) of this Consent Decree, together with a request for approval. The United States' decision whether to approve the transferee's substitution for Mosaic under this Consent Decree, and what conditions may attend approval, will take into account: (i) the status of the projects in Appendix 6 (RCRA Compliance Schedule), (ii) whether the transferee has or will have prior to the transfer the financial and technical capability to comply with this Consent Decree, (iii) and other factors that may be deemed relevant, including but not limited to the environmental compliance history of the proposed transferee and the environmental management capabilities of the proposed transferee. As set forth in Appendix 2, Paragraph 36, any such transfer will not include the Financial Assurance obligations specified for Mosaic therein, and therefore will include Financial Assurance conditions appropriate to the transferee. Any transfer of ownership or operation of all or a portion of the Facilities without complying with this Paragraph constitutes a violation of this Consent Decree. The United States' refusal to approve, or approval with conditions for, the substitution of the transferee for Mosaic under this Consent Decree shall be subject to dispute resolution pursuant to Section XI (Dispute Resolution) of this Consent Decree, but any judicial review shall be conducted pursuant to Paragraph 76(a) of this

Consent Decree. If Mosaic does not prevail in such judicial review, Mosaic shall pay all costs incurred by the United States in connection with such judicial review, including attorney's fees.

6. Mosaic shall: (1) provide a copy of this Consent Decree to its President/CEO, Executive Vice Presidents, Senior Environmental Counsel, and the General Manager, Environmental Manager, and Maintenance Manager of each Facility, and shall ensure that any employees and contractors whose duties might reasonably include compliance with any provision of this Consent Decree are made aware of this Consent Decree and specifically aware of the requirements of this Consent Decree that fall within such person's duties; (2) place an electronic version of the Consent Decree on its internal environmental website; and (3) post notice of lodging of the Consent Decree and its availability in a location at each Facility where legal notices are posted. Mosaic shall be responsible for ensuring that all employees and contractors involved in performing any Work pursuant to this Consent Decree perform such Work in compliance with the requirements of this Consent Decree.

7. In any action to enforce this Consent Decree, Mosaic shall not raise as a defense the failure by any of its officers, directors, employees, agents, or contractors to take any actions necessary to comply with the provisions of this Consent Decree.

III. DEFINITIONS

8. Every term expressly defined by this Section shall have the meaning given that term herein, regardless of whether it is elsewhere defined in federal or state law. Every other term used in this Consent Decree that is also a term used under RCRA, as amended, 42 U.S.C. §§ 6901 et seq., its implementing regulations, or La. R.S. 30:2001 et seq. and its implementing regulations, shall have the same meaning in this Consent Decree as such term has under RCRA or under federal or Louisiana regulations. In the case of a conflict between federal and state

definitions, federal definitions shall control. For purposes of this Consent Decree, whenever terms defined below or in Appendices 1-9 hereto are used in this Consent Decree, such definitions shall apply:

a. Bevill-Exempt Wastes shall mean Phosphogypsum and Process Wastewater from phosphoric acid production through mineral processing, which are solid wastes excluded from hazardous waste regulation pursuant to 40 C.F.R. § 261.4(b)(7)(ii)(D) and (P);

b. Big Holding Tank (BHT) shall mean the tank(s) that Mosaic will install as compliance projects and that are designated as Big Holding Tank(s) in the Uncle Sam Facility Report;

c. BHT Effluent shall mean the output solution consisting of any or all of the inputs to the BHT that are described in the Uncle Sam Facility Report;

d. BHT Recovery Units comprise the BHT and those units in Downstream Operations from which, as specified in the Uncle Sam Facility Report, cleaning wastes and other materials will be circulated to the BHT for recovery in Upstream Operations or reuse as a cleaning solution following completion of the relevant compliance projects;

e. Complaint shall mean the complaint filed by the United States and LDEQ in this action;

f. Consent Decree shall mean this Consent Decree and all Appendices identified in Section XXIV (Appendices) and attached hereto. In the event of any conflict between this Consent Decree and any Appendix hereto, this Consent Decree shall control;

g. Corrective Action Work shall mean 1) the activities described in Paragraphs 17 - 19 of Appendix 1, Attachment A; 2) the activities described in Section II.D of Appendix 1,

Attachment B; and/or 3) other activities taken at the express direction of EPA or LDEQ pursuant to their respective legal authorities to address a release of:

(1) the following products, including intermediates and wastes: phosphoric acid, sulfuric acid, and FSA;

(2) the following cleaning solutions, including entrained wastes and solids: SACS, PACS, and FSACS;

(3) Process Wastewater, including mixtures and entrained wastes and solids;

(4) Phosphogypsum Stack System Wastewater, including mixtures and entrained wastes and solids;

(5) BHT Effluent, IGPU Effluent, or GHT Effluent, including entrained wastes and solids when such releases occur: a) within Upstream or Downstream Operations; b) from Mixed-Use, Grandfathered, or Recovery Units; or c) from the Phosphogypsum Stack System, as identified in a Facility's Facility Report. Corrective Action Work does not include other activities to be taken at the direction of EPA or LDEQ pursuant to their residual authorities to address other releases of hazardous waste and/or hazardous constituents that may affect human health and the environment, which directions and activities will be undertaken outside of, and will not be subject to, this Consent Decree ("Non-CD Corrective Action");

h. DAP shall mean diammonium phosphate, which is manufactured in Granulation;

i. Day shall mean a calendar day unless expressly stated to be a business day. In computing any period of time under this Consent Decree, where the last day would fall on a Saturday, Sunday, or federal or State of Louisiana holiday, the period shall run until the close of business of the next business day;

j. Defendant or Mosaic shall mean Mosaic Fertilizer, LLC. Mosaic's parent company, The Mosaic Company, shall be referred to by its full corporate name;

k. Downstream Operations shall mean all Facility operations involving the storage, management, transport, treatment, disposal or further processing of the First Saleable Product, manufacturing operations that use the First Saleable Product as a feedstock, and fluorosilicic acid (FSA) production operations, unless designated as a Mixed-Use Unit or Grandfathered Unit in that Facility's Facility Report.

l. EPA shall mean the United States Environmental Protection Agency and any of its successor departments or agencies;

m. Effective Date is defined in Section XVI (Effective Date);

n. Facility or Facilities shall mean any one or more of Mosaic's Louisiana operations at Uncle Sam or Saint James (Faustina), which include manufacturing plants, Phosphogypsum Stack Systems, and such other contiguous or adjacent property owned and/or operated by Mosaic, as delineated in Appendix 3 (Site Maps).

o. Facility Reports shall mean the reports dated September 8, 2015 (Uncle Sam), and September 29, 2015 (Faustina), attached hereto collectively as Appendix 4, prepared by EPA following inspections of Mosaic's Uncle Sam and Faustina Facilities, which identify, where appropriate, the Facility's Upstream and Downstream Operations, its Mixed-Use Units, BHT Recovery Units, Grandfathered Units, Granulation Plant Units, Interim Granulation Plant Units, Granulation Sump Ditches, compliance projects, and proposed future installations;

p. Financial Assurance shall mean financial assurance for the benefit of EPA and LDEQ in order to ensure coverage for Third-party Liability, Phosphogypsum Stack System

Closure, and Long Term Care, as set forth in Appendix 2 (Financial Assurance) of this Consent Decree;

q. First Saleable Product shall mean:

(1) Merchant Grade Acid (MGA), whether or not it is actually placed into commerce; or,

(2) if applicable, any intermediate phosphoric acid product with a P_2O_5 content less than or equal to MGA that is diverted from further processing into MGA in order to be placed into commerce, further concentrated above 54% P_2O_5 (by weight), or used as a feedstock in manufacturing MAP/DAP, Superphosphoric Acid (SPA), Purified Acid, or other chemical manufacturing products;

r. FSA shall mean fluorosilicic acid (H_2SiF_6).

s. FSA Cleaning Solution (FSACS) shall mean a solution of FSA or wastewater from FSA production (excluding waste solids not entrained in cleaning solutions but instead mechanically removed from FSA production, such as filtration residue, tank bottoms, and Swift Tower clean-out residue) with Non-Hazardous Aqueous Cleaning Solution (NHACS), Phosphogypsum Stack System Wastewater, and/or Process Wastewater used for cleaning pipes, tanks or other equipment;

t. Grandfathered Unit shall mean a pipe, tank and/or other production, storage, or transportation unit in Downstream Operations specifically identified in the Uncle Sam Facility Report as not feasibly segregable from Upstream Operations;

u. Granulation shall mean the process of converting liquid phosphoric acid, ammonia, secondary nutrients, and/or micronutrients into solid ammonium phosphate fertilizer in Downstream Operations;

v. Granulation Plant Units (GPUs) shall mean those units identified in the Faustina Facility Report that Mosaic has installed or will install as compliance projects to manage, store or transport Downstream wastes for use in Granulation;

w. Granulation Plant Unit Effluent (GPU Effluent) shall mean the output solution consisting of any or all of the inputs to the GPUs that are described in the Faustina Facility Report;

x. Granulation Plant Holding Tank(s) shall mean the GPUs that Mosaic will install as a compliance project to replace certain of the IGPUs and to manage, store or transport Downstream wastes for use in Granulation.

y. Interim Granulation Plant Units (IGPUs) shall mean those units identified in the Faustina Facility Report that manage, store or transport Downstream wastes for use in Granulation until they discontinue handling Downstream wastes in compliance with Appendix 6 (RCRA Project Narrative and Compliance Schedule) or such time as the Granulation Plant Holding Tanks are put in service to replace them.

z. Interim Granulation Plant Unit Effluent (IGPU Effluent) shall mean the output solution consisting of any or all of the inputs to the IGPUs that are described in the Faustina Facility Report;

aa. Granulation Sump Ditches are identified in the Faustina Facility Report.

bb. Interest shall mean the interest rate specified in 28 U.S.C. § 1961;

cc. LDEQ shall mean the State of Louisiana Department of Environmental Quality and any of its successor departments or agencies;

dd. MAP shall mean monoammonium phosphate;

ee. Merchant Grade Acid (MGA) shall mean phosphoric acid that is typically 52% to 54% (by weight) of P_2O_5 but may vary slightly across the phosphoric acid industry, manufactured from the direct reaction of phosphate rock and sulfuric acid and containing less than one percent (1%) solids content;

ff. DAP Recycle Pond is the ditch and pond system described in LDEQ Permit P-0092RI and depicted in the Facility Report;

gg. Mixed-Use Unit shall mean a pollution control device, pipe, tank and/or other production, storage, or transportation unit specifically identified in the Uncle Sam Facility Report as serving both Upstream Operations and Downstream Operations;

hh. Non-Hazardous Aqueous Cleaning Solution (NHACS) shall mean an aqueous solution, including without limitation fresh water, non-hazardous condensate, non-hazardous recycled water, and non-hazardous recovered groundwater, used for cleaning pipes, tanks or other equipment that, if evaluated as a solid waste before use, is not a RCRA listed or characteristic hazardous waste as defined by 40 C.F.R., Part 261, Subparts C and D;

ii. Paragraph shall mean a portion of this Consent Decree identified by an arabic numeral;

jj. Parties shall mean the United States, LDEQ, Mosaic and, where applicable, The Mosaic Company;

kk. Phosphogypsum shall mean calcium sulfate and byproducts produced by the reaction of sulfuric acid with phosphate rock to produce phosphoric acid. Phosphogypsum is a solid waste within the definition of Section 1004(27) of RCRA, 42 U.S.C. § 6903(27);

ll. Phosphogypsum Stack shall mean any defined geographic area associated with a phosphoric acid production plant in which Phosphogypsum is disposed of or stored, other than within a fully enclosed building, container or tank;

mm. Phosphogypsum Stack System shall mean the defined geographic area associated with a phosphoric acid production facility in which Phosphogypsum and Process Wastewater is disposed of or stored, together with all pumps, piping, ditches, drainage, conveyances, water control structures, collection pools, cooling/surge ponds (including former cooling/surge ponds that have been converted to lime treatment sludge ponds), auxiliary holding ponds, regional holding ponds, and any other collection or conveyance system associated with the transport of Phosphogypsum from the phosphoric acid plant to the Phosphogypsum Stack, its management at the stack, and the Process Wastewater return to phosphoric acid production. This definition specifically includes toe drain systems and ditches and other leachate collection systems, but does not include conveyances within the confines of the phosphoric acid or fertilizer production plant(s) or emergency diversion impoundments used in emergency circumstances caused by rainfall events of high volume or duration for the temporary storage of Process Wastewater to avoid discharges to surface waters of the State;

nn. Phosphogypsum Stack System Wastewater shall mean waste water in the Phosphogypsum Stack System containing Bevill-Exempt Wastes commingled with hazardous wastes as alleged in the Complaint;

oo. Phosphoric Acid Cleaning Solution (PACS) shall mean a solution of phosphoric acid (generated from an operation in which at least 50 percent of the feedstock in a calendar year was from ores or minerals or beneficiated ores or minerals) and Non-Hazardous Aqueous

Cleaning Solution, Phosphogypsum Stack System Wastewater, and/or Process Wastewater used for cleaning pipes, tanks or other equipment;

pp. Pond 11 is the surface impoundment described in LDEQ Permit P-0063 and depicted in the Faustina Facility Report;

qq. Process Wastewater shall mean process wastewater from phosphoric acid production. The following wastestreams constitute process wastewater from phosphoric acid production: water from phosphoric acid production operations through concentration to the First Saleable Product; process wastewater generated from Upstream Operations that is used to transport Phosphogypsum to the Phosphogypsum Stack; Phosphogypsum Stack runoff (excluding non-contact runoff); process wastewater generated from a uranium recovery step in phosphoric acid production; process wastewater generated from non-ammoniated animal feed production (including defluorination, but excluding ammoniated animal feed production) operations that qualify as mineral processing operations based on the definition of mineral processing that EPA finalized on September 1, 1989; and process wastewater generated from a superphosphate production process that involves the direct reaction of phosphate rock with dilute phosphoric acid with a concentration less than Merchant Grade Acid [see 55 Fed. Reg. 2328, January 23, 1990];

rr. Purified Phosphoric Acid (PPA) shall mean a refined grade of phosphoric acid where contaminants have been removed from wet-process phosphoric acid through solvent extraction, chemical precipitation, filtration, or other purification processes to produce a purified phosphoric acid product suitable for food grade or other higher purity phosphoric acid applications (as of the date of lodging of this Consent Decree, Mosaic does not manufacture Purified Phosphoric Acid);

ss. RCRA Requirements shall mean the requirements of RCRA Subtitle C, the applicable regulations in 40 C.F.R. Parts 260-270, and La. R.S. 30:2171 et seq. and the applicable regulations in LAC 33:V.Subpart 1;

tt. Section shall mean a portion of this Consent Decree identified by a roman numeral;

uu. State shall mean the State of Louisiana;

vv. Sulfuric Acid Cleaning Solution (SACS) shall mean a solution of sulfuric acid and Non-Hazardous Aqueous Cleaning Solution, Phosphogypsum Stack System Wastewater, and/or Process Wastewater used for cleaning pipes, tanks or other equipment;

ww. Superphosphoric Acid (SPA) shall mean liquid phosphoric acid (not a solid phosphate product such as granulated triple superphosphoric acid) generally with a P_2O_5 content greater than MGA, resulting from the concentration of wet process acid that does not involve the direct reaction of phosphate ore in such concentration operations (as of the date of lodging of this Consent Decree, Mosaic does not manufacture SPA);

xx. Treatment for the purposes of Paragraph 18 herein shall mean any method, technique, or process, including neutralization, designed to change the physical, chemical, or biological character or composition of a waste so as to neutralize such waste or so as to recover energy or material resources from the waste, or so as to remove or reduce a hazardous constituent of the waste or make it safer to transport, store, or dispose of, or amenable for recovery, amenable for storage, or reduced in volume;

yy. United States shall mean the United States of America, acting on behalf of EPA;

zz. Upstream Operations shall mean all phosphoric acid mineral processing operations resulting in the manufacture of the First Saleable Product; and

aaa. Work shall mean any activity that Mosaic must perform to comply with the requirements of this Consent Decree, including Appendices.

IV. CIVIL PENALTY

9. Within thirty (30) Days after the Effective Date of this Consent Decree, Mosaic shall pay the sum of \$3,900,000.00 as a civil penalty, together with Interest accruing from the date on which the Consent Decree is lodged with the Court, at the rate specified in 28 U.S.C. § 1961 as of the date of lodging, in accordance with Paragraphs 10 and 11.

10. Mosaic shall pay the sum of \$2,350,000.00, together with Interest accruing from the date on which the Consent Decree is lodged with the Court, to the United States by FedWire Electronic Funds Transfer (EFT) to the U.S. Department of Justice, in accordance with written instructions to be provided by the Financial Litigation Unit of the U.S. Attorney's Office for the Eastern District of Louisiana, 500 Poydras Street, Suite 210, New Orleans, Louisiana, 70130 (504) 680-3000 to Mosaic within ten (10) days of lodging of the Consent Decree. At the time of payment, Mosaic shall send a copy of the EFT authorization form and the EFT transaction record, together with a transmittal letter, to the United States in accordance with Section XV (Notices) of this Consent Decree; by email to acctsreceivable.CINWD@epa.gov; and by mail to:

EPA Cincinnati Finance Office
26 Martin Luther King Drive
Cincinnati, OH 45268

The transmittal letter shall state that the payment is for the civil penalty owed pursuant to the Consent Decree in United States et al. v. Mosaic Fertilizer, LLC, and shall reference the civil action number and DOJ case number 90-7-1-08388.

11. Mosaic shall pay the sum of \$1,550,000.00 as a civil penalty, together with Interest accruing from the date on which the Consent Decree is lodged with the Court, to LDEQ by EFT in accordance with instructions that will be provided by LDEQ within ten (10) Days of

the lodging of this Consent Decree. At the time of payment, Mosaic shall send a copy of the EFT authorization form and the EFT transaction record, together with a transmittal letter, to LDEQ in accordance with Section XV (Notices) of this Consent Decree. The transmittal letter shall state that the payment is for a civil penalty owed pursuant to the Consent Decree in United States et al. v. Mosaic Fertilizer LLC, and shall reference LDEQ File Number 015-176-SET-038 and DOJ case number 90-7-1-08388.

12. Mosaic shall not deduct any penalties paid under this Consent Decree pursuant to this Section or Section IX (Stipulated Penalties) in calculating its federal or Louisiana or local income tax.

V. COMPLIANCE REQUIREMENTS

13. Compliance Projects and Schedule.

(a) Completed Activities. Mosaic has already completed the following activities at the Faustina Facility in compliance with the below-referenced Consent Decree Paragraph(s) or Appendices/Attachments to this Consent Decree: Granulation Plant Sump System (Paragraph 16); Phase 1 of the DAP Pond Sampling and characterization (Paragraph 23).

(b) Uncle Sam Facility. Mosaic shall undertake the actions set forth in Appendix 5 (Best Management Practices (BMP) Plan) and Appendix 6 (RCRA Project Narrative and Compliance Schedule) of this Consent Decree to improve its waste management practices, pursuant to the description and schedule set forth in Appendix 6 (RCRA Project Narrative and Compliance Schedule). For any wastes generated by or managed in units that are identified in Section VI (Compliance Projects) of the Uncle Sam Facility Report found in Appendix 4 (Facility Reports) as part of the compliance projects set forth in Appendix 6 (RCRA Project Narrative and Compliance Schedule) requiring installation, construction, modification, shut

down, or replacement to cease commingling of hazardous wastes with Bevill-Exempt Wastes, and for any wastes that will be managed differently as a result of installing, constructing, modifying, shutting down, or replacing units, as specified in Section VI (Compliance Projects) of Appendix 4 (Facility Reports), Mosaic's waste management obligations under this Section V (Compliance Requirements) shall become effective upon completion of those compliance projects.

(c) Faustina Facility. Mosaic shall implement certain Facility changes at the Faustina Facility pursuant to the description and schedule set forth in the Faustina Facility Report found in Appendix 4 (Facility Reports) and Appendix 6 (RCRA Project Narrative and Compliance Schedule). For any wastes that will be managed differently as a result of installing, constructing, modifying, shutting down, or replacing units, as specified in Section VI (Compliance Projects) of Appendix 4 (Facility Reports), Mosaic's waste management obligations under this Section V (Compliance Requirements) shall become effective upon completion of those compliance projects.

14. Hazardous Waste Determinations.

(a) Uncle Sam Facility. Mosaic shall make a RCRA hazardous waste determination, pursuant to 40 C.F.R. § 262.11, of all solid wastes generated at the Uncle Sam Facility within Upstream or Downstream Operations, or from Mixed-Use, Grandfathered Units, or BHT Recovery Units other than: (1) Bevill-Exempt Wastes; and (2) those wastes that Paragraphs 15-18 of this Consent Decree allow to (i) be input to Upstream Operations or (ii) managed in BHT Recovery Units or (iii) managed with Bevill Exempt Wastes, and, if the wastes are hazardous, Mosaic shall manage such wastes in compliance with the RCRA Requirements.

(b) Faustina Facility. Mosaic shall make a RCRA hazardous waste determination, pursuant to 40 C.F.R. § 262.11, of all solid wastes generated at the Faustina Facility other than those wastes that Paragraph 16 allows to be input to Granulation or managed in IGPU's, GPU's or the Granulation Sump Ditches, and, if the wastes are hazardous, Mosaic shall manage such wastes in compliance with the RCRA Requirements.

15. Wastes from Upstream Operations and Co-Managed Wastes at the Uncle Sam Facility.

(a) Provided that any Phosphogypsum Stack System ultimately receiving the wastes enumerated below is subject to the requirements of Appendix 1, Attachment B (Groundwater Requirements), Attachment C (Phosphogypsum Stack System Construction and Operational Requirements), and Sections I, II, III and VI of Attachment D (Closure of Phosphogypsum Stacks/Stack Systems), as modified by Paragraph 22(a)(2)(i), and the Financial Assurance requirements of this Consent Decree set forth in Paragraph 25 and Appendix 2 (collectively the Stack System Requirements), the following wastes may be: (i) input into Upstream Operations; or (ii) treated, stored, managed, transported or disposed of together with Bevill-Exempt Wastes in accordance with this Consent Decree:

- (1) Process Wastewater, Phosphogypsum Stack System Wastewater, and Phosphogypsum;
- (2) Wastes from air pollution control devices that are associated with Upstream Operations or that are identified as Mixed-Use Units in the Uncle Sam Facility Report; and
- (3) Wastes generated from the use of Phosphogypsum Stack System Wastewater, Process Wastewater, a Non-Hazardous Aqueous Cleaning Solution, or any combination thereof, to clean pipes, tanks, process equipment, or other

storage or transport units that are:

- (i) Part of Upstream Operations;
- (ii) Serve to manage, store, or transport Bevill-Exempt Wastes; or
- (iii) Identified as Mixed-Use or Grandfathered Units in the Uncle Sam Facility Report.

(b) Prior to commencement of operations of Compliance Project 1 (Big Holding Tank and Wash Solution System in the Phosphoric Acid Plant) and Project 2 (Cleaning Solution Return Piping) of Section VI (Compliance Projects) of Appendix 4 (Facility Reports) at the Uncle Sam Facility, Mosaic may continue to manage wastes generated from Upstream Operations, Mixed-Use Units, Grandfathered Units, BHT Recovery Units, or units that serve to manage, store, or transport Bevill-Exempt Wastes as specifically documented in Mosaic's consolidated waste management practices submittal dated September 8, 2015.

(c) Following commencement of operations of Compliance Project 1 (Big Holding Tank and Wash Solution System in the Phosphoric Acid Plant) and Project 2 (Cleaning Solution Return Piping) of Section VI (Compliance Projects) of Appendix 4 (Facility Reports) for the Uncle Sam Facility, the following wastes may be input to Upstream Operations via the BHT as described in Projects 1 and 2 of Section VI (Compliance Projects) of the Uncle Sam Facility Report set forth in Appendix 4 and in accordance with the BMP set forth in Appendix 5:

- (1) Spills and leaks of all grades of phosphoric acid, sulfuric acid, FSA, SACS, PACS, FSACS, or BHT Effluent; or NHACS, Process Wastewater, or Phosphogypsum Stack System Wastewater when mixed with any of the preceding solutions due to spills, leaks, or cleaning of spills and leaks;

(2) Wastes generated from the use of SACS, PACS, BHT Effluent, FSA, FSACS, NHACS, Process Wastewater, and/or Phosphogypsum Stack Wastewater to clean pipes, tanks, process equipment, or other storage or transport units that are:

- (i) Part of Upstream Operations;
- (ii) Serve to manage, store, or transport Bevill-Exempt Wastes;
- or
- (iii) Identified as Mixed-Use, Grandfathered, or BHT Recovery Units in the Uncle Sam Facility Report.

In the event of a process upset after commencement of operations of the BHT and Cleaning Solution Return Piping Projects that prevents the input of SACS, PACS, BHT Effluent, FSA, or FSACS to Upstream Operations via the BHT, Mosaic: (1) shall not discharge to the Phosphogypsum Stack System any SACS, PACS, BHT Effluent, FSA, or FSACS in cleaning those units affected by the process upset; and (2) shall make a RCRA hazardous waste determination, pursuant to 40 C.F.R. § 262.11, of any cleaning wastes generated from BHT Recovery Units and not input to the BHT and, if the wastes are hazardous, shall manage such wastes in compliance with the RCRA Requirements. (d) If Mosaic, in the cleaning of Upstream Operations, Mixed-Use, Grandfathered, or BHT Recovery Units, uses any cleaning materials other than Phosphogypsum Stack System Wastewater, Process Wastewater, BHT Effluent, PACS, SACS, FSA, FSACS, or NHACS that, if evaluated as a solid waste before use, would be a RCRA listed or characteristic hazardous waste as defined by 40 C.F.R., Part 261, Subparts C and D and would generate a hazardous waste when mixed with Bevill-Exempt Process Wastewater under the Bevill Mixture Rule, 40 C.F.R. § 261.3(a)(2)(i) and (g)(4), then Mosaic

shall make a RCRA hazardous waste determination pursuant to 40 C.F.R. § 262.11, of the cleaning waste and, if the waste is hazardous, Mosaic shall manage such waste in compliance with the RCRA Requirements.

(e) Mosaic shall manage any solids removed by means other than cleaning solutions from Upstream Operations, Mixed-Use, Grandfathered, and BHT Recovery Units in accordance with the BMP set forth in Appendix 5.

(f) Equipment maintenance, repair activities, and emergency situations in Downstream Operations at a Facility may occasionally require Mosaic to temporarily store or transport a First Saleable Product in or through tanks or pipes that are part of Upstream Operations, and/or Mixed-Use or Grandfathered Units. Provided that: a) the use of any individual unit in Upstream Operations, or any Mixed-Use or Grandfathered Unit, for such temporary storage of a First Saleable Product does not exceed ninety (90) Days consecutively or one-hundred twenty (120) Days cumulatively per calendar year; and b) if the First Saleable Product is not stored or transported for greater than ninety (90) Days consecutively outside of Downstream Operations, then the cleaning wastes generated from such units that are used for the temporary transport and storage of the First Saleable Product may be managed with wastes from Upstream Operations. Notice of such temporary use of tanks or pipes that are part of Upstream Operations, or of Mixed-Use or Grandfathered Units, for a First Saleable Product must be given to EPA and LDEQ within seven (7) Days of the commencement of such temporary use, but advance approval will not be required. Mosaic shall keep a log of all such temporary uses. If Mosaic violates any of the time limits set forth in this Paragraph, Mosaic shall not manage cleaning wastes generated outside the prescribed time period with wastes from Upstream Operations. In the event of a second violation of any of these time limits within three-hundred

and sixty-five (365) Days of a first violation, Mosaic within 30 Days shall construct a separate system for the temporary transport and storage of the First Saleable Product, which system shall be part of Downstream Operations. Violations of the time limits set forth in this Paragraph are not subject to Paragraph 32 (Correction of Non-Compliance) but may be subject to dispute resolution (but not judicial review) under Section XI of this Consent Decree (Dispute Resolution) or to a claim under Section X (Force Majeure).

16. Wastes from Downstream Operations at Uncle Sam and Faustina. Unless otherwise authorized by Paragraphs 15(a), (b), (c), (e) or (f), Paragraphs 16 (a) - (c), below, or Paragraphs 17(a) or (b), Mosaic shall manage all hazardous wastes generated from: Downstream Operations (including, without limitation, units that transport, store, treat, or manage the First Saleable Product (e.g., pipes, tanks, railcars, barges); chemical manufacturing processes that use the First Saleable Product as a feedstock (e.g., MAP/DAP, SPA or PPA processes); FSA production processes; pollution control devices, waste storage, transport and treatment units, cleaning wastes (liquid and solids), and spills and leaks from all such processes and units) in compliance with the RCRA Requirements, regardless of the use of any Bevill-Exempt Wastes as influent to such Downstream Operations. If any Mixed-Use Units or Grandfathered Units are replaced, modified, or reconfigured after the date of the Uncle Sam Facility Report such that they serve to manage, store or transport materials from Downstream Operations that are not identified in that Facility Report as being associated with those Units, they will be deemed to serve Downstream Operations, and any hazardous wastes generated thereafter from such Units will be subject to this Paragraph.

(a) Waste Management at Uncle Sam. Mosaic may re-use or recover certain wastes from Downstream Operations in Upstream or Downstream Operations as specifically

documented in the Uncle Sam Facility Report.

(b) Waste Management at Faustina. The Faustina Facility does not engage in mineral processing and does not generate Bevill-Exempt wastes. All solid wastes generated at the Faustina Facility as described in Faustina's Facility Report are generated from Downstream Operations. Prior to completion of the Faustina Facility changes required pursuant to Paragraph 13(b) above, Mosaic may continue to manage wastes from the Granulation Sump Ditches, IGPUs, and GPUs as specifically documented in Mosaic's consolidated waste management practices submittal dated September 8, 2015. Upon completion of Faustina Project 3 (Granulation Plant Holding Tank Installation) set forth in Appendix 6 (RCRA Project Narrative and Compliance Schedule), Mosaic shall no longer use the IGPUs to manage wastes.

(1) Cleaning Wastes. Wastes generated from the use of NHACS, SACS, IGPU Effluent or GPU Effluent to clean pipes, tanks, process equipment, or other storage or transport units and spills and leaks of NHACS, IGPU Effluent, GPU Effluent, SACS, phosphoric acid, or sulfuric acid may be input to Granulation, as described in Section V (Current Configuration) of Faustina's Facility Report. In the event of a process upset that prevents the input of such wastes to Granulation, Mosaic shall make a RCRA hazardous waste determination of the cleaning wastes generated from those units affected by the process upset, pursuant to 40 C.F.R. § 262.11 and, if the wastes are hazardous, shall manage such wastes in compliance with the RCRA Requirements.

(2) Projects. Mosaic has already modified certain of the containment pads and sumps at the Faustina Facility, as identified in the Faustina Facility Report.

— (i) Granulation Sump Ditches. Mosaic shall implement Project 9 (Inspections, Maintenance and Repair of Ditches Flowing in the Granulation Sump) for the

Granulation Sump Ditches in compliance with Appendix 6 (RCRA Project Narrative and Compliance Schedule) for Project 7 and thereafter shall manage the Granulation Sump Ditches in compliance with Project 7.

(ii) IGPUs. Mosaic shall implement Projects 4 (Interim Granulation Plant Units - Tanks and Transfer Lines Operating Requirements) and 5 (Interim Granulation Plant Units - Sump Operating Requirements) for all IGPUs in compliance with Appendix 6 (RCRA Project Narrative and Compliance Schedule) until completion of Faustina Project 3 (Granulation Plant Holding Tank Installation) set forth in Appendix 6 (RCRA Project Narrative and Compliance Schedule).

(iii) Other Projects. Mosaic shall implement Projects 3 (Granulation Plant Holding Tank Installation), 6 (RCRA Requirements), 7 (40 CFR Part 265, Subpart J- Tank Standards for the Granulation Sump), 8 (40 CFR Part 265, Subpart J- Tank Standards for the Existing Holding Tank Sump), and 10 (RCRA Training) in compliance with and on the schedules set forth in Appendix 6 (RCRA Project Narrative and Compliance Schedule). Upon completion of those projects, Mosaic shall comply with 40 C.F.R. Parts 262 and 265 and the regulations in LAC 33:V. Ch. 11 and 19.

Notwithstanding the foregoing requirements of this Paragraph 16(b), Mosaic may re-use or recover certain wastes generated at the Faustina Facility in Downstream Operations as specifically documented in the Faustina Facility Report.

17. FSA at the Uncle Sam Facility.

(a) FSA, and wastewater carrying entrained solids from FSA production, a part of Downstream Operations, may be managed as described in Section IV.D (Fluorosilicic Acid

(FSA) Standard Process Configuration) and Section VI Compliance Project 1 (BHT) and Project 3 (BHT piping) of Appendix 4 (Facility Reports) for the Uncle Sam Facility.

(b) Waste solids not entrained in cleaning solutions but instead mechanically recovered from FSA production (such as filtration residue, tank bottoms, and Swift Tower clean-out residue) shall be managed in accordance with the BMP Plan set forth in Appendix 5.

(c) Wastes generated from FSA production that are not subject to Paragraphs 17(a) and 17(b) shall be managed in compliance with the RCRA Requirements.

18. Wastes from Treatment of Uncle Sam Phosphogypsum Stack System Wastes.

Provided that any Phosphogypsum Stack System ultimately receiving the wastes complies with the Stack System Requirements set forth in Paragraph 15(a), wastes generated from the Treatment of materials in the Phosphogypsum Stack System through (i) the use of reverse osmosis or (ii) any other Treatment process that does not introduce into such materials hazardous constituents or other contaminants that would result in a violation of applicable discharge limits may be: (1) input to Upstream Operations; or (2) treated, stored, managed, transported and disposed of together with Bevill-Exempt Wastes, in accordance with this Consent Decree.

19. Transfer of Wastes between the Facilities. In the event that Mosaic transfers hazardous waste, or Bevill-Exempt Wastes historically commingled with hazardous waste, between the Facilities, Mosaic shall comply with the RCRA Requirements. Nothing in this Consent Decree shall restrict the transfer and management of Bevill-Exempt Wastes and non-hazardous waste between the Facilities that is in compliance with all federal and Louisiana laws.

20. Sulfuric Acid Plant. Mosaic shall manage hazardous wastes generated at the Uncle Sam sulfuric acid plant in accordance with applicable law.

21. Site Assessment and Corrective Action.

(a) Mosaic has already completed or will complete certain site assessment activities pursuant to existing RCRA Section 3013 Orders for both Facilities that are deemed to satisfy the requirements of Paragraphs 1-16 of Appendix 1, Attachment A (Site Assessment, Reporting and Corrective Action). Mosaic's obligation to complete the Corrective Action Work are part of the Work required by this Consent Decree, but shall be set forth in and governed by an administrative agreement, permit, or order issued by LDEQ under its authorized state program, and subject to EPA's residual RCRA authorities under RCRA and Paragraphs 21(c) and 88 of this Consent Decree. Mosaic's performance of its obligations pursuant to the preceding sentence shall be subject to Paragraph 9 - 16 of Appendix 1, Attachment A, as applicable.

(b) Mosaic's obligations under Paragraphs 17-19 of Attachment A of Appendix 1 shall be deemed to be fully satisfied on the date that LDEQ confirms Mosaic's certification that Mosaic has completed all requirements of any such administrative agreement, permit, or order issued by LDEQ to govern the Corrective Action Work defined in Paragraph 8(g)(1), provided that EPA does not exercise its residual authorities under RCRA and this Consent Decree as set forth in Paragraph 21(c), below. Appendix 1, Attachment A is included as part of this Consent Decree in order to advise the Court and the public of sampling and analysis activities already completed or that will be completed by Mosaic, pursuant to the RCRA Section 3013 Orders, as part of its settlement with the United States and LDEQ, and the Parties' intent to implement any necessary risk assessment and/or Corrective Action Work under LDEQ's administrative authorities, and to reflect Plaintiffs' residual authority to secure necessary Corrective Action Work pursuant to their reservation of rights in Paragraphs 86 and 88 of this Consent Decree.

(c) EPA reserves the right to fully and directly enforce all the requirements of Appendix 1, Attachment A, if EPA: (i) notifies Mosaic within sixty (60) Days of LDEQ's issuance of an administrative agreement, permit, or order setting forth and governing the Corrective Action Work defined in Paragraph 8(i)(a), that such administrative agreement, permit, or order does not adequately address the Corrective Action Work required under Paragraph 18 of Appendix 1, Attachment A; (ii) after consultation with LDEQ, notifies Mosaic that it has determined that Mosaic is not in compliance with an issued administrative agreement, permit, or order or (iii) notifies Mosaic within sixty (60) Days of LDEQ's failure to issue an administrative agreement, permit, or order for Corrective Action Work that should be required under the terms of Paragraph 18 of Appendix 1, Attachment A. Any decision by EPA to directly enforce these Work requirements shall not be subject to judicial review, but shall be subject to dispute resolution (other than judicial review) pursuant to Section XI (Dispute Resolution) of this Consent Decree, although Mosaic retains its right to invoke dispute resolution as set forth in Section XI (Dispute Resolution) regarding any liability for asserted non-compliance with the Work requirements of this Consent Decree, including any liability for stipulated penalties.

22. Phosphogypsum Stack Systems at the Facilities.

(a) Uncle Sam Facility. If Mosaic is in compliance with the requirements of Paragraph 22(a), such compliance shall be deemed to satisfy the corresponding requirements of the Louisiana Solid Waste Management and Resource Recovery Law (La. R.S. 30:2151 et seq.) and the regulations promulgated thereunder (LAC 33:VII, Subpart 1), applicable to Phosphogypsum Stack Systems, with respect to the Uncle Sam Phosphogypsum Stack System.

(1) Mosaic shall comply with all requirements set forth in Appendix 1, Attachment B (Groundwater Requirements), Attachment C (Phosphogypsum Stack System

Construction and Operational Requirements), Attachment D (Closure of Phosphogypsum Stacks/Stack Systems), Attachment E (Imminent and Substantial Endangerment Diagnostic Requirements), and Attachment G (Phosphogypsum Stack System Closure Application) at the Uncle Sam Facility, except as provided in Appendix 8. The Parties agree that AOC MM-AOA-14-00269 shall be terminated as a separate order as of the Effective Date.

(2) Liner Alternatives

(i) Plaintiffs agree that the Uncle Sam Phosphogypsum Stack System, subject to Mosaic's completion of the Work required pursuant to Appendix 7 (Liner Compliance Requirements, Exemptions and Conditions) of this Consent Decree, either (i) meet the liner requirements of Appendix 1, Attachment C (Phosphogypsum Stack System Construction and Operational Requirements); or (ii) complies or will comply with the requirements, exemptions and conditions of Appendix 7 (Liner Compliance, Exemptions and Conditions) upon completion of the projects identified in Appendix 7, and thereby are or will be deemed to be environmentally protective and an acceptable alternative to the requirements of Appendix 1, Attachment C (Phosphogypsum Stack System Construction and Operational Requirements).

(ii) In the event that Mosaic determines that it is not in compliance with the requirements, exemptions, and/or conditions set forth in Appendix 7 for the Uncle Sam Facility, Mosaic within ninety (90) Days of identifying the non-compliance shall investigate the cause of the non-compliance and submit an Evaluation of Remedial Options to address the non-compliance for approval by EPA, in consultation with LDEQ. The Evaluation of Remedial Options must: (i) evaluate the cause of the failure to meet the requirements and/or conditions in Appendix 7; (ii) identify and evaluate those measures needed to return to compliance with Appendix 7; (iii) identify and evaluate potential remedial alternatives to address any groundwater

contamination that has migrated beyond the Point(s) of Compliance for the Uncle Sam Facility as provided in Appendix 1, Attachment B (Section IV); (iv) identify and evaluate potential remedial alternatives to prevent or mitigate further migration of groundwater contamination; and (v) recommend one of the identified remedial alternatives for implementation.

(iii) If EPA, in consultation with LDEQ, determines that Mosaic is not in compliance with the requirements, exemptions, and/or conditions set forth in Appendix 7 for a the Uncle Sam Facility, EPA shall so notify Mosaic in a written statement explaining the basis for its conclusion. Within ninety (90) Days of receiving such notice from EPA, Mosaic shall submit to EPA for approval, in consultation with LDEQ, the Evaluation of Remedial Options as required by Paragraph 22(a)(ii) or shall submit pursuant to Paragraphs 27-31 a written explanation of why it does not believe the alleged failure exists.

(3) If Mosaic determines to construct a Lateral Expansion of the existing Uncle Sam Phosphogypsum Stack System adjacent to the existing Phosphogypsum Stack System (e.g., "Expansion Stack 5A") with an alternative design than Appendix 1, Attachment C, Section VI, then, no less than eighteen months prior to the start of construction of Expansion Stack 5A, Mosaic shall submit a proposed design to EPA and LDEQ for their review and approval, and a solid waste permit major modification request to LDEQ in accordance with applicable provisions of the Louisiana Solid Waste regulations. Any Phosphogypsum Stack System expansion documentation submitted pursuant to Appendix 2 (Financial Assurance) shall not affect LDEQ's permit authority under the Louisiana Solid Waste regulations. If LDEQ approves an alternative liner in accordance with applicable Louisiana Solid Waste Regulations, which is subject to "EPA review" under Paragraph 31, the alternative liner shall be deemed to satisfy the liner requirements of Appendix 1, Attachment C, Section VI.

(4) Mosaic shall submit the Initial Phosphogypsum Stack System Closure Plan required in Appendix 1, Attachment D, Section II simultaneously with its first annual updated Cost Estimate submitted pursuant to Appendix 2, Paragraph 4(b).

(b) Faustina Facility. Mosaic shall comply with Section VI (Long Term Care for Phosphogypsum Stacks/Stack Systems) requirements of Appendix 1, Attachment D (Closure of Phosphogypsum Stacks/Stack Systems), all groundwater monitoring requirements of Attachment B (Groundwater Requirements), and Section I of Attachment E (Imminent and Substantial Endangerment Requirements) for the Faustina Facility. If Mosaic is in compliance with the approved post-closure plan for this Facility, such compliance shall be deemed to satisfy the Work requirements of Appendix 1, Attachment D.

23. DAP Recycle Pond at the Faustina Facility. Mosaic shall comply with requirements in Appendix 6 (RCRA Project Narrative and Compliance Schedule) regarding Plaintiffs' April 9, 2014 approval of Mosaic's Sampling and Analysis Report and future closure of the DAP Recycle Pond. Mosaic shall not place wastes in the DAP Recycle Pond, but may continue to use the DAP Recycle Pond to collect stormwater. Provided that Mosaic complies with this requirement, it shall not be required under this Consent Decree to conduct additional sampling of the DAP Recycle Pond, although EPA and LDEQ reserve all authorities to require sampling under applicable federal or state law. The final plan for the closure of the DAP Recycle Pond is subject to the LDEQ Risk Evaluation/Corrective Action program (RECAP), and Paragraphs 27-31.

24. Aboveground Facilities for the Permitted UIC Well. Mosaic shall comply with Appendix 8.

25. Financial Assurance. Mosaic shall secure and maintain Financial Assurance for the benefit of EPA and LDEQ pursuant to the requirements of Appendix 2 (Financial Assurance) of this Consent Decree as specified in Paragraphs 25(a) and 25(b) below. Mosaic's inability to secure and/or maintain adequate Financial Assurance for the Uncle Sam and/or Faustina Facilities shall in no way excuse performance of the Work or any other requirement of this Consent Decree.

(a) Uncle Sam Facility. Mosaic shall secure and maintain Financial Assurance for the benefit of EPA and LDEQ pursuant to the requirements of Appendix 2 (Financial Assurance) of this Consent Decree, including a corporate guarantee provided by The Mosaic Company and attached hereto as Appendix 2, Attachment I, in order to ensure coverage for: (i) Third-party Liability; and (ii) Phosphogypsum Stack System Closure (and Long-Term Care).

(b) Faustina Facility. Mosaic shall secure and maintain Financial Assurance for the benefit of EPA and LDEQ pursuant to the requirements of Appendix 2 (Financial Assurance) of this Consent Decree, including a corporate guarantee provided by The Mosaic Company and attached hereto as Appendix 2, Attachment I, in order to ensure coverage for: (i) Third-party Liability; (ii) Phosphogypsum Stack System Long Term Care; and (iii) Closure and Long Term Care, as defined in Appendix 2, for the DAP Recycle Pond.

(c) If Mosaic establishes Financial Assurances under Paragraphs 25(a) and 25(b) pursuant to the requirements of Appendix 2, such Financial Assurances shall also satisfy Mosaic's obligations to comply with LAC 33:V. Chapter 37 and LAC 33:VII. Chapter 13, including the reporting requirements thereof, with respect to (a) Closure and Post-Closure Care for the Phosphogypsum Stack System at the Uncle Sam Facility, (b) Post-Closure Care for the

Phosphogypsum Stack System at the Faustina Facility, and (ii) Closure and Post-Closure Care for the DAP Recycle Pond at the Faustina Facility.

(d) Corrective Action Work at Uncle Sam and Faustina Facilities. In the event that LDEQ or EPA determine that, pursuant to Paragraphs 21 or 22, Corrective Action Work is required, then Financial Assurance for the Corrective Action Work shall be addressed through an administrative agreement, order, or the modification of the Facility's solid waste permit in the manner provided in LAC 33:VII.1305. If EPA, in lieu of LDEQ, directs Corrective Action Work pursuant to this Consent Decree, then Mosaic shall secure and maintain Financial Assurance for Corrective Action Work for the benefit of EPA pursuant to Appendix 2, Section IV.

26. In addition to the financial assurance information included in the reports required pursuant to Section VIII (Reporting Requirements) of this Consent Decree, Mosaic or The Mosaic Company as guarantor shall provide to EPA and LDEQ, upon request, any information or reports that Plaintiffs are authorized to request pursuant to Section 3007 of RCRA, 40 C.F.R. Part 264 Subpart H, La. R.S. 30:2001 et seq. and LAC 33:VII.Chapter 13, or any other applicable statutory or regulatory information-gathering authorities, regarding the financial status of Mosaic or The Mosaic Company as guarantor, the financial mechanism(s) provided by Mosaic or The Mosaic Company as guarantor to meet its obligation for Financial Assurance, and the financial institution or guarantor providing the financial mechanism(s) to secure Mosaic's or The Mosaic Company's obligations, pursuant to Appendix 2 (Financial Assurance).

27. Review and/or Approval of Submissions. Where any provision of this Consent Decree requires Mosaic to submit a plan, notification, report, procedure, protocol or other deliverable, the submission shall be subject to either "EPA approval" or "EPA review," as set forth in Paragraphs 28-31, below. If there is any question as to whether a particular submission

requires EPA approval or review, it shall be submitted for approval subject to EPA's discretion to treat it as a submission for review. All work plans, reports and other items that are developed and submitted to EPA for approval pursuant to this Consent Decree shall be complete and technically adequate, and shall incorporate all applicable requirements of Appendix 1.

28. Submissions Subject to EPA Approval. After review of any work plan, report, or other item set forth below that is required to be submitted, or revised and resubmitted to EPA for approval pursuant to this Consent Decree, EPA, after consultation with LDEQ, shall in writing: (a) approve the submission; (b) approve the submission upon specified conditions; (c) approve part of the submission and disapprove the remainder; or (d) disapprove the submission. In the event of disapproval of any portion of the submission, EPA shall include a statement of the reasons for such disapproval in its response. The following submissions required under Appendix 1 are subject to EPA approval:

1. Groundwater Monitoring Plan (Attachment B, Section III (1) and (2));
2. Stack Closure Plan (Attachment D, Section I, Section III (1));
3. Initial Stack Closure Plan (Attachment D, Section II (1));
4. Corrective Action Plan (Attachment A, (18)) and Attachment B, Section IV (3));
5. Interim Stack System Monitoring Program and Monitoring Program Revisions (Attachment C, Section I (6));
6. Dike Concerns, including Problems, Proposals to Upgrade or Retrofit Dikes, Submissions of Interim Measures for Dike Stability and Submissions of Proposals to Modify the Existing Dike System (Attachment C, Section II (1), (2), (3) and (5));
7. Liners for New Stack Systems Construction: (1) Submission of Construction Quality Assurance Plan for Composite Liner Design; (2) Provision of Liner System Installation Report of Compliance with Construction Quality Assurance Plan after Installation of Liner is Complete; (3) Submission of Documentation of Quality Control Testing of the Liner Construction (Attachment C, Section VI);
8. Alternatives Plan and Implementation Schedule for Water Management (Attachment C, Section VII 6(h) and (7)(c));
9. Requests for Temporary Deactivation of Stack System on a Yearly Basis (Attachment D, Section IV (1) - (7));
10. Use of Closed Phosphogypsum Stack Systems (Attachment D, Section

- V (5));
11. Reduced Long-Term Care Schedule (Attachment D, Section VI (2));
 12. Submission of outline for a Sampling and Analysis Workplan (Attachment A, (1));
 13. Submission of Sampling and Analysis Workplan and Sampling and Analysis Report (Attachment A, (2) and (5));
 14. Submission of Risk Assessment Plan and Report (Attachment A, (18));
 15. Submission of an Interim Measures Plan and Report (Attachment A, (18));
 16. Approval to Construct Perimeter Dikes that do not meet minimum 1.5 safety factor (Attachment C, Section III, (1)(e)(ii));
 17. Alternate Final Cover (Attachment D, Section III, (7)(c)); and
 18. Corrective Action Certification Report (Attachment A (18)(a)(iii).

29. Approval or Conditional Approval. If the submission is approved pursuant to Paragraph 28(a), Mosaic shall take all actions required by the plan, report, or other document, in accordance with the schedules and requirements of the plan, report, or other document, as approved. If the submission is conditionally approved or approved only in part, pursuant to Paragraph 28(b) or (c), Mosaic shall, upon written direction from EPA, take all actions required by the approved plan, report, or other item that EPA determines are technically severable from any disapproved portions, subject to Mosaic's right to dispute only the specified conditions, the disapproval, or the determination of the technical severability of portions of the submission under Section XI (Dispute Resolution) of this Consent Decree.

30. Disapproval in Whole or Part.

(a) If the submission is disapproved in whole or in part pursuant to Paragraph 28(c) or 28(d), Mosaic shall, within sixty (60) Days or such other time as the Parties agree to in writing, correct all deficiencies and resubmit the plan, report, or other item, or disapproved portion thereof, for approval, in accordance with the preceding Paragraphs. If the submission has been previously disapproved, EPA may impose an earlier due-date for resubmission, but not less than fourteen (14) Days. If the resubmission is approved in whole or in part, Mosaic shall proceed in accordance with the provisions of this Paragraph governing approval of submissions.

(b) If a resubmitted plan, report, or other item, or portion thereof, is disapproved in whole or in part, EPA, after consultation with LDEQ, may again require Mosaic to correct any deficiencies in accordance with the preceding Paragraphs, may itself correct any deficiencies, or may finally disapprove the submission, subject to Mosaic's right to invoke dispute resolution under Section XI (Dispute Resolution) and the right of EPA and LDEQ to seek stipulated penalties as provided in the following Sub-Paragraph. If the resubmission is approved or corrected in whole or in part, Mosaic shall proceed in accordance with Paragraph 29.

(c) Any stipulated penalties applicable to the original submission, as provided in Section IX (Stipulated Penalties) of this Consent Decree, shall accrue during the sixty (60) Day period or other agreed upon period, but shall not be payable unless the resubmission is untimely or is disapproved in whole or in part; provided that, if the original submission was so deficient as to constitute a material breach of Mosaic's obligations under this Consent Decree, the stipulated penalties applicable to the original submission shall be due and payable notwithstanding any subsequent resubmission.

31. Submissions subject to EPA Review. For submissions set forth below that are subject to EPA review, EPA, in consultation with LDEQ, within 60 Days of receiving the submission may provide written comments on the submission, in whole or in part, or EPA may decline to comment, or may notify Mosaic that comments will be provided at a later date not to exceed 120 Days from the date of submission. If EPA provides written comments, Mosaic within 45 Days of receiving such comments shall modify the submission consistent with EPA's written comments unless it has invoked Dispute Resolution pursuant to Section XI of the Consent Decree. A decision by EPA to decline to comment does not constitute approval of the submission or waive any obligation by Mosaic to comply with the requirements of this Consent

Decree or any applicable federal, Louisiana, or local laws governing such submissions. The following submissions required by Appendix 1 and this Consent Decree are subject to EPA review:

1. Groundwater Monitoring Well Reports (Attachment B, Section III (3)(a) and (b));
2. Inspection of Phosphogypsum Stack Report (Attachment C, Section VII (3));
3. Information on Perimeter Dikes (Attachment C, Section II (1));
4. Report on Final Survey and Record Drawings after Permanent Closure is complete (Attachment D, Section V (2));
5. Certification of Closure Construction Completion (Attachment D, Section V (3));
6. Certification of Long-Term Care Completion (Attachment D, Section VI (4));
7. Notification of Groundwater Sampling Schedule (Attachment B, Section II (3)(d));
8. Notification of Start Date of Construction of New Dikes (Attachment C, Section III (5)(a));
9. Report on Conditions for Temporary Non-emergency Use of the Design Freeboard (Attachment C, Section IV, (2)(b) and (c));
10. File on Inspection of a New Phosphogypsum Stack System (Attachment C, Section V (4));
11. Annual Contingency Plan and Training Plan (Attachment C, Section VIII (1) and (2));
12. Replacement of Monitoring Device within Sixty (60) Days of Notification to EPA (Attachment D, Section VI (3));
13. Documentation Demonstrating the Continued Safety and Stability of the Dike (Attachment E, Section II (1));
14. Expansion Stack 5A alternative liner (Consent Decree ¶ 22(a)(3));
15. Submission of Report of Critical Condition and Proposal for Correction (Attachment E, Section I (1) and Section III (1));
19. Final Construction Quality Assurance Report (Attachment D, Section III (8));
20. Remedial EDI Plan (Attachment E, Section IV (4)); and
21. Corrective Action Work Implementation Plan (Attachment A (18)(a)(ii)(2).
22. Submission of a RECAP Evaluation (Attachment B, Section IV); and
23. New Phosphogypsum Stack System or Lateral Expansion designed with an appropriate safety factor (Attachment C, Section VI, (4);

32. Correction of Non-Compliance at the Uncle Sam Facility.

(a) If Mosaic determines, with or without notice from EPA and/or LDEQ, that it is violating, or will violate, any requirement of Section V (Compliance Requirements) of this Consent Decree, other than those set forth in Paragraphs 15(f) (temporary storage of First Saleable Product) and 25 (Financial Assurance obligations governed by Appendix 2 (Financial Assurance)), Mosaic shall submit with its report of the violation, pursuant to Section VIII (Reporting Requirements) of this Consent Decree, and shall subsequently implement, a Correction Plan to rectify the violation, if it has not already corrected the violation by the time of the report. The Correction Plan shall include a schedule for correcting the violation.

(b) In the event of a violation subject to Paragraph 32(a), Mosaic shall be considered to be in compliance with this Consent Decree for purposes of: (1) continuing to manage wastes that Paragraphs 15 through 18 allow to be input to Upstream Operations or Downstream Operations or managed in BHT Recovery Units or together with Bevill-Exempt Wastes; and (2) assessing Mosaic's compliance with this Consent Decree under Paragraphs 34, 85, 86 and 87 of this Consent Decree, provided that:

(1) Mosaic deposits wastes governed by Paragraphs 15-18 only in a Phosphogypsum Stack System subject to the Stack System Requirements set forth in Paragraph 15(a); and

(2) Mosaic:

(i). Timely implements and completes its Correction Plan; or

(ii). Refers an allegation of non-compliance with Section V (Work Requirements) or with a Correction Plan to dispute resolution pursuant to Section XI (Dispute Resolution) and either

a. Prevails in the dispute resolution or

- b. Satisfactorily complies with an EPA or judicial directive to correct any instances of non-compliance

(collectively, Continuing Compliance Criteria). Nothing in this Paragraph shall be construed as EPA approval of Mosaic's correction efforts pursuant to this Paragraph, as a waiver of stipulated penalties for the violation pursuant to Section IX (Stipulated Penalties), or as limiting the rights reserved by Plaintiffs under Section VI (Work Takeover) or Paragraph 88 of this Consent Decree. EPA reserves the right to require, upon written request that a Correction Plan be submitted to EPA for approval in accordance with Paragraphs 27 - 31, above. Mosaic's compliance with this Paragraph is without prejudice to its rights under Section X (Force Majeure) and Section XI (Dispute Resolution) of this Consent Decree.

33. Permits. Where any compliance obligation under this Section requires Mosaic to obtain a federal, Louisiana, or local permit, or other form of approval, Mosaic shall submit timely and complete applications and take such actions as are necessary to obtain all such permits or approvals. A request for supplementation by the permitting agency does not constitute a notice or finding that an application was incomplete for the purpose of this Paragraph unless the permitting agency determines that the original application was so deficient as to constitute a material breach of Mosaic's obligations under this Consent Decree. Mosaic may seek relief under the provisions of Section X (Force Majeure) of this Consent Decree for any delay in the performance of any such obligation resulting from a failure to obtain, or a delay in obtaining, any permit or approval required to fulfill such obligation, if Mosaic has submitted timely and complete applications and has taken such actions as are necessary to timely obtain all such permits or approvals.

34. Provided that Mosaic remains in compliance with Section V (Compliance Requirements) or the Continuing Compliance Criteria set forth in Paragraph 32 at the Uncle Sam Facility, that Facility shall not be required to operate as a Treatment Storage and Disposal Facility pursuant to Section 3005 of RCRA and its implementing federal and/or Louisiana regulations, with respect to:

(a) the treatment, storage, transport, management, and disposal of Bevill-Exempt Wastes that have been commingled with hazardous wastes or otherwise managed in violation of law as alleged in the Complaint,

(i) prior to the lodging of this Consent Decree,

(ii) prior to completing the compliance projects set forth in Appendix 6 (RCRA Project Narrative and Compliance Schedule) as provided by Paragraph 13, or

(iii) during timely implementation of a Correction Plan as set forth in Paragraph 32; and

(b) wastes that Paragraphs 15 through 18 allow to be input to Upstream Operations or Downstream Operations or managed in BHT Recovery Units or together with Bevill-Exempt Wastes.

VI. WORK TAKEOVER

35. In the event EPA determines that Mosaic has: (a) ceased implementation of any portion of the Work; or (b) is seriously or repeatedly deficient or late in its performance of the Work; or (c) is implementing the Work in a manner that may cause an endangerment to human health or the environment, EPA, after consultation with LDEQ and with the joint approval of the EPA Region 6 Regional Administrator and the Assistant Administrator for the EPA Office of Enforcement and Compliance Assurance, may issue a written notice (Work Takeover Notice) to

Mosaic. Any Work Takeover Notice issued by EPA shall specify the grounds upon which such notice was issued and shall provide Mosaic a period of thirty (30) Days within which to remedy the circumstances giving rise to EPA's issuance of such notice.

36. If, after expiration of the thirty (30) Day period specified in Paragraph 35 of this Section, the Work Takeover Notice has not been withdrawn by EPA and Mosaic has not remedied to EPA's satisfaction the circumstances giving rise to EPA's issuance of the Work Takeover Notice, EPA at any time thereafter may undertake Work Takeover by: (a) assuming and/or directing the performance of; (b) seeking the appointment of a receiver to direct the performance of; or (c) accessing Financial Assurance (with the concurrence of LDEQ) to finance the performance of all or any portions of the Work that EPA deems necessary to correct the violations or conditions that triggered the Work Takeover Notice pursuant to Paragraph 35 (Work Takeover). EPA shall notify Mosaic in writing (which writing may be electronic) if EPA determines that implementation of a Work Takeover is warranted under this Section of the Consent Decree. In the event that EPA seeks to appoint a receiver to direct the performance of the Work, Mosaic shall not oppose such appointment on grounds other than lack of competence or conflict of interest, but shall retain its right to challenge the underlying Work Takeover in Dispute Resolution, as set forth in the following Paragraph and Section XI (Dispute Resolution) of this Consent Decree. In implementing any Work Takeover, EPA shall make reasonable efforts not to interfere with Facility operations not directly affected by the conditions that triggered the Work Takeover.

37. In the event that Mosaic invokes Section XI (Dispute Resolution) of this Consent Decree with respect to EPA's Work Takeover and/or its selection of options set forth in Paragraph 36 (which must be disputed together with the underlying Work Takeover and pursuant

to Paragraph 76(a) of this Consent Decree), EPA during the pendency of any such dispute may, in its unreviewable discretion, commence and continue a Work Takeover until the earlier of: (a) the date that Mosaic remedies, to EPA's satisfaction, the circumstances giving rise to issuance of the Work Takeover Notice; or (b) the date that a final decision is rendered in accordance with Section XI (Dispute Resolution) of the Consent Decree requiring EPA to terminate such Work Takeover.

38. After commencement and for the duration of any Work Takeover, EPA or any appointed receiver shall have immediate access to and benefit of any Financial Assurance provided pursuant to Paragraph 25 of this Consent Decree and Appendix 2 to implement the Work. If EPA or any appointed receiver are unable to access the Financial Assurance, or the Work addressed by the Work Takeover is not covered by Financial Assurance, then any unreimbursed costs incurred by EPA in connection with the Work Takeover shall be considered a financial obligation owed by Mosaic to the United States and collectible in an action to enforce this Consent Decree. Nothing in this Paragraph shall be construed to relieve Mosaic of its obligation to provide adequate Financial Assurance pursuant to Appendix 2. In the event that it is determined in Dispute Resolution that the Work Takeover was not warranted, any unexpended funds in a Stand-by Trust that originated from a letter of credit, surety bond or corporate guarantee shall be used to restore any pre-existing Trust Fund to the pre-Work Takeover level, if necessary, and any balance of unexpended funds shall be released and used to re-establish the original financial mechanism(s).

VII. BENEFICIAL ENVIRONMENTAL PROJECTS

39. Within thirty (30) Days after the Effective Date of the Consent Decree, Mosaic shall deposit \$1,000,000.00 into an escrow account established and administered by LDEQ, in

accordance with instructions that will be provided by LDEQ within sixty (60) Days of the lodging of this Consent Decree, for the purpose of LDEQ's conducting the beneficial environmental projects (BEPs) identified in this Section. After January 1, 2020, any funds that remain in this escrow account and that have not been committed to the BEPs identified in this Section will be transferred by LDEQ to the Louisiana Hazardous Waste Clean-Up Fund.

40. Minerals Toxicity Study and Mineral Criteria Assessment BEP. LDEQ will assess statewide water quality criteria/standards for minerals (e.g., chlorides, sulfates) based upon a thorough review of scientific literature, data from aquatic toxicity tests, and a review of criteria/standards from other states and jurisdictions. BEP funding will be utilized in conducting aquatic toxicity testing that will be utilized in establishing a statewide formula for the development of mineral criteria and/or standards protective of waters of the State. The results of these studies will provide data that may be used by Louisiana to help develop or refine state mineral related standards.

41. Minerals Toxicity Study and Mineral Criteria Assessment BEP Objectives. The objectives for the BEP referenced in Paragraph 40 are to: (1) Develop a study, including acute and chronic toxicity tests, on representative Louisiana species across a range of hardness values (including low hardness waters) typical of Louisiana; and (2) Conduct toxicity studies to determine acute and chronic effects to calculate ratios and/or genus mean acute values that can be used to help develop State standards for chlorides, sulfates, and/or other appropriate minerals criteria.

42. Producer-Specific Watershed Nutrient Management Plans BEP. LDEQ, in coordination with the Louisiana State University Agricultural Center, will develop producer-specific master programs and Watershed Nutrient Management Plans (collectively WNMP) to be

utilized by beef cattle, dairy, and poultry producers for the purpose of reducing pollution, such as excess nutrients, into the environment through improved farm practices specific to producer needs. These WNMPs will enhance the Comprehensive Nutrient Management Plans that are available from the United States Department of Agriculture (USDA) by incorporating complementary activities for nutrient management, such as operation and maintenance, tracking, monitoring, and beneficial use.

43. Producer-Specific Watershed Nutrient Management Plans BEP Objectives. The objectives for the BEP referenced in Paragraph 42 are to: (1) Develop WNMPs to address nutrients, potentially including the completion of an environmental needs assessment to identify the water quality issues for a watershed; and (2) Develop WNMPs for the identified producer-specific commodities in targeted watersheds.

44. Mosaic's funding of the escrow account shall not be construed as an endorsement of, and Mosaic reserves all rights to dispute, any methodologies, analyses, conclusions or findings resulting from the BEPs described above.

45. If Defendant fails to deposit funds in the escrow account in accordance with Paragraph 39, stipulated penalties may be assessed under Section IX (Stipulated Penalties).

VIII. REPORTING REQUIREMENTS

46. If Mosaic determines that it has violated or will violate, any requirement of this Consent Decree, Mosaic shall notify EPA and LDEQ of such violation and its likely duration, in writing (unless otherwise directed by EPA or LDEQ), within twelve (12) Days of the date Mosaic first becomes aware of the violation, with an explanation of the likely cause of the violation and of the remedial steps taken, or to be taken, to prevent or minimize such violation. If the cause of a violation cannot be fully explained at the time the report is due, Mosaic shall so

state in the report. Mosaic shall investigate the cause of the violation and shall then submit an amendment to the report, including a full explanation of any identifiable cause(s) of the violation, within thirty (30) Days of the date Mosaic becomes aware of the violation. Nothing in this Paragraph or Paragraphs 47 and 48 relieves Mosaic of its obligation to provide the notice required by Section X of this Consent Decree (Force Majeure).

47. Periodic Reporting

(a) Uncle Sam. Within forty-five (45) Days after the end of each calendar-quarter after lodging of this Consent Decree (quarters shall be calculated based on Mosaic's December 31st end-of-fiscal-year), until the quarter ending after the completion of all the projects listed in Appendix 6 (RCRA Narrative and Compliance Schedule) for the Uncle Sam Facility, Mosaic shall submit to EPA and LDEQ a report for the Uncle Sam Facility for the preceding calendar quarter that shall include (a) the status of any construction or compliance measures described in Appendix 6; (b) completion of milestones set forth in Appendix 6; (c) problems encountered or anticipated, together with implemented or proposed solutions, with projects described in Appendix 6; (d) status of permit applications for projects described in Appendix 6; (e) status of plans for closure and long-term care and status of permit application, as applicable, for closure or long-term care; (f) operation and maintenance difficulties or concerns relating to compliance with Paragraphs 15 and 17 - 18; (g) status of Financial Assurance; (h) a description of any violation of the requirements of this Consent Decree reported under Paragraph 46 and an explanation of the likely cause of such violation and of the remedial steps taken, or to be taken, to prevent or minimize such violation; (i) the log of any temporary use of units in Upstream Operations, Mixed-Use Units or Grandfathered Units for the storage of the First Saleable Product; (j) the log of spills and leaks tracked pursuant to the BMP set forth in Appendix 5; and

(k) identification of any confirmed “critical condition” as defined and reported to LDEQ and/or EPA pursuant to Appendix 1. Thereafter, and for a period of two (2) years, Mosaic shall submit such reports to Plaintiffs on a semi-annual basis. Thereafter, Mosaic shall submit such reports annually until such time as Mosaic submits the Uncle Sam Closure Application pursuant to Appendix 1, Attachments D (Closure of Phosphogypsum Stacks/Stack Systems) and G (Phosphogypsum Stack System Closure Application). Mosaic shall submit its next report within one-hundred-eighty (180) Days after the submission of the Uncle Sam Closure Application, and annually thereafter until this Consent Decree is terminated with respect to the Uncle Sam Facility.

(b) Faustina. Within forty-five (45) Days after the end of each calendar-quarter after lodging of this Consent Decree (quarters shall be calculated based on Mosaic’s December 31st end-of-fiscal-year), until the quarter ending after the completion of Projects 1 - 5, 7 - 8, and 10 listed in Appendix 6 (RCRA Narrative and Compliance Schedule) for the Faustina Facility, Mosaic shall submit to EPA and LDEQ a report for the Faustina Facility for the preceding calendar quarter that shall include (a) the status of any construction or compliance measures described in Appendix 6; (b) completion of milestones set forth in Appendix 6; (c) problems encountered or anticipated, together with implemented or proposed solutions, with projects described in Appendix 6; (d) status of permit applications for projects described in Appendix 6; (e) status of plans for long-term care and status of permit application, as applicable, for closure or long-term care; (f) operation and maintenance difficulties or concerns relating to compliance with Paragraph 16; (g) status of Financial Assurance; (h) a description of any violation of the requirements of this Consent Decree reported under Paragraph 46 and an explanation of the likely cause of such violation and of the remedial steps taken, or to be taken, to prevent or

minimize such violation; and (i) any notification or reporting pursuant to 40 CFR 265.196(d) or LAC 33:V.1913.D, as set forth in Project 6 in Appendix 6 (RCRA Narrative and Compliance Schedule) for the Faustina Facility. Thereafter, Mosaic shall submit such reports annually until this Consent Decree is terminated with respect to the Faustina Facility.

48. Whenever any violation of this Consent Decree, or any other event affecting Mosaic's performance under this Consent Decree or the performance of its Facility, may pose an immediate threat to the public health or welfare or the environment, Mosaic shall, unless otherwise directed, notify EPA and LDEQ in Section XV (Notices) orally or by electronic or facsimile transmission as soon as possible, but no later than twenty-four (24) hours after Mosaic first knew of the event, and shall comply with the requirements of Appendix 1, Attachment E (Imminent and Substantial Endangerment Diagnostic Requirements). Any violation of this notice requirement shall be deemed to terminate on the Day that both Plaintiffs have received actual notice of the violation or event from Mosaic or by other means. This notice requirement does not relieve Mosaic of its obligation to comply with any federal and state laws applicable to the violation or event. This notice requirement is in addition to the requirement to provide notice of a violation of this Consent Decree set forth in the preceding Paragraph.

49. All reports shall be submitted to the persons designated to receive Notices for Plaintiffs in Section XV (Notices) of this Consent Decree. All notices and submittals to "EPA and/or LDEQ" under this Consent Decree (including Appendices), other than those required by this Section or that are submitted for approval pursuant to Paragraphs 27-31, may be submitted to LDEQ only, provided that a copy of the cover letter identifying the notice or submittal is also sent to EPA. Mosaic also shall supply EPA with a copy of such notice(s) or submittal(s) upon request by EPA.

50. Each report submitted by Mosaic under this Section shall be signed by a responsible corporate official of Mosaic (as defined in 40 C.F.R. § 270.11(a)) and shall include the following certification:

I certify under penalty of law that this document and all attachments were prepared under my direction or supervision in accordance with a system designed to assure that qualified personnel properly gather and evaluate the information submitted. Based on my inquiry of the person or persons who manage the system, or those persons directly responsible for gathering the information, the information submitted is, to the best of my knowledge and belief, true, accurate, and complete. I am aware that there are significant penalties for submitting false information, including the possibility of fine and imprisonment for knowing violations.

This certification requirement does not apply to emergency notifications where compliance would be impractical.

51. The reporting requirements of this Consent Decree do not relieve Mosaic of any reporting obligations required by the RCRA Requirements, or by any other federal, Louisiana, or local law, regulation, permit, or other requirement. However, the reporting requirements of this Consent Decree shall not require Mosaic to re-submit any report, plan or information submitted by Mosaic to EPA and/or LDEQ prior to the Effective Date of this Consent Decree.

52. Any information provided pursuant to this Consent Decree may be used by the Plaintiffs in any proceeding to enforce the provisions of this Consent Decree and as otherwise permitted by law.

IX. STIPULATED PENALTIES

53. Mosaic shall be liable for stipulated penalties to the United States and LDEQ for violations of this Consent Decree as specified below, unless excused under Section X (Force Majeure). A violation includes failing to perform any obligation required by the terms of this Consent Decree, including any work plan or schedule approved under this Consent Decree,

according to all applicable requirements of this Consent Decree and within the specified time schedules established by or approved under this Consent Decree.

54. Civil Penalty and BEPs. If Mosaic fails to pay the civil penalty and/or fails to submit payment to an escrow account for the BEPs, as required under Sections IV (Civil Penalty) and VII (Beneficial Environmental Projects) of this Consent Decree when due, Mosaic shall pay a stipulated penalty of \$1,000 per Day for each Day that the payment is late for the first ten (10) Days, together with Interest. Thereafter, Mosaic shall pay \$3,000 per Day for each Day that the payment is late, with Interest. Late payment of the federal civil penalty shall be made in accordance with Section IV (Civil Penalty), Paragraph 10, and late payment of the Louisiana penalty and/or BEP funding shall be made in accordance with Section IV (Civil Penalty), Paragraph 11. Stipulated penalties for late payment of the civil penalty or BEP shall be paid in accordance with Paragraphs 58 - 64, below. All transmittal correspondence shall state that any such payment is for late payment of the civil penalty or BEP due under this Consent Decree, or for stipulated penalties for late payment, as applicable, and shall include the identifying information set forth in Paragraphs 10 or 11, above as applicable.

55. Compliance Requirements. The following stipulated penalties shall accrue per violation per Day for each violation of the requirements identified in Section V (Compliance Requirements):

<u>Penalty Per Violation Per Day</u>	<u>Period of Noncompliance</u>
\$1,000	1st through 14th Day
\$2,000	15th through 30th Day
\$3,000	31st Day and beyond

(a) Uncle Sam Facility. Stipulated penalties shall not apply to spills and leaks that are

successfully managed in compliance with the approved BMP set forth in Appendix 5.

56. Reporting Requirements. The following stipulated penalties shall accrue per violation per Day for each violation of the requirements of Section VIII of this Consent Decree (Reporting Requirements):

<u>Penalty Per Violation Per Day</u>	<u>Period of Noncompliance</u>
\$ 750	1st through 14th Day
\$1,000	15th through 30th Day
\$2,000	31st Day and beyond

57. Subject to the provisions of Paragraph 30(c), above, and except as otherwise specified in Paragraphs 30(c) and 65(b), stipulated penalties under this Section shall begin to accrue on the Day after performance is due or on the Day a violation occurs, whichever is applicable, and shall continue to accrue until performance is satisfactorily completed or until the violation ceases. Stipulated penalties shall accrue simultaneously for separate violations of this Consent Decree.

58. Mosaic shall pay stipulated penalties to the United States and to LDEQ within twelve (12) Days of a written demand by either Plaintiff, subject to its right to invoke dispute resolution in accordance with Section XI (Dispute Resolution). Except as provided in Paragraph 45, Mosaic shall pay fifty percent (50%) of the total stipulated penalty amount due to the United States and fifty percent (50%) to LDEQ. The Plaintiff making a demand for payment of a stipulated penalty shall simultaneously send a copy of the demand to the other Plaintiff.

59. Each Plaintiff, may, in the unreviewable exercise of its discretion, reduce or waive stipulated penalties otherwise due to it under this Consent Decree. The determination by

one Plaintiff not to seek stipulated penalties, or to subsequently waive or reduce the amount it seeks, shall not preclude the other Plaintiff from seeking the full amount of the stipulated penalties owed.

60. Stipulated penalties shall continue to accrue as provided in Paragraph 57, during any Dispute Resolution, but need not be paid until the following:

(a) If the dispute is resolved by agreement or by a decision of the United States or LDEQ that is not subject to judicial review or appealed to the Court, Mosaic shall pay accrued penalties determined to be owing, together with Interest, to the United States or LDEQ within thirty (30) Days of the effective date of the agreement or the receipt of the United States' or LDEQ's decision or order.

(b) If the dispute is appealed to the Court and the United States or LDEQ prevails in whole or in part, Mosaic shall pay all accrued penalties determined by the Court to be owing, together with Interest, within sixty (60) Days of receiving the final Court decision.

61. Mosaic shall pay stipulated penalties owing to the United States in the manner set forth and with the confirmation notices required by Paragraph 10, except that the transmittal letter shall state that the payment is for stipulated penalties and shall state for which violation(s) the penalties are being paid. Mosaic shall pay stipulated penalties owing to LDEQ in accordance with Paragraph 11, except that the transmittal letter shall state that the payment is for stipulated penalties and shall state for which violation(s) the penalties are being paid.

62. Mosaic shall not deduct stipulated penalties paid under this Section in calculating its Louisiana and federal income tax.

63. If Mosaic fails to pay stipulated penalties according to the terms of this Consent Decree, Mosaic shall be liable for Interest on such penalties, as provided for in 28 U.S.C. § 1961,

accruing as of the date payment became due. Nothing in this Paragraph shall be construed to limit the United States or LDEQ from seeking any remedy otherwise provided by law for Mosaic's failure to pay any stipulated penalties.

64. Subject to the provisions of Section XIII (Effect of Settlement/ Reservation of Rights) of this Consent Decree, the stipulated penalties provided for in this Consent Decree shall be in addition to any other rights, remedies, or sanctions available to the United States or LDEQ for Mosaic's violation of this Consent Decree or applicable law. Where a violation of this Consent Decree is also a violation of relevant statutory or regulatory requirements, Mosaic shall be allowed a credit for any stipulated penalties paid against any statutory penalties imposed for such violation.

X. FORCE MAJEURE

65. Force majeure, for purposes of this Consent Decree, is defined as any event arising from causes beyond the control of Mosaic, of any entity controlled by Mosaic, or of Mosaic's contractors that delays or prevents the performance of any obligation under this Consent Decree despite Mosaic's best efforts to fulfill the obligation. The requirement that Mosaic exercise best efforts to fulfill the obligation includes using best efforts to anticipate any potential force majeure and best efforts to address the effects of any potential force majeure (1) as it is occurring and (2) following the potential force majeure such that the delay and any adverse effects of the delay are minimized to the greatest extent possible. Force majeure does not include Mosaic's financial inability to perform any obligation under this Consent Decree.

66. If any event occurs or has occurred that may delay the performance of any obligation under this Consent Decree, whether or not caused by a force majeure event, Mosaic shall provide notice orally or by electronic or facsimile transmission as soon as possible, as

provided in Section XV (Notices) of this Consent Decree, but not later than seven (7) Days after the time when Mosaic first knew that the event might cause a delay. Within ten (10) Days thereafter, Mosaic shall provide written notice to EPA and LDEQ with an explanation and description of the reasons for the delay; the anticipated duration of the delay; all actions taken or to be taken to prevent or minimize the delay; a schedule for implementation of any measures to be taken to prevent or mitigate the delay or the effect of the delay; Mosaic's rationale for attributing such delay to a force majeure event if it intends to assert such a claim; and a statement as to whether, in the opinion of Mosaic, such event may cause or contribute to an endangerment to public health, welfare or the environment. Mosaic shall include with any notice all available documentation supporting a claim that the delay was attributable to a force majeure event. Mosaic shall be deemed to know of any circumstance of which Mosaic, any entity controlled by Mosaic, or Mosaic's contractors knew or reasonably should have known. Failure to comply with the above requirements regarding an event shall preclude Mosaic from asserting any claim of force majeure regarding that event, provided, however, that if EPA, despite the late notice, is able to assess to its satisfaction whether the event is a force majeure under Paragraph 65 and whether Mosaic has exercised its best efforts under Paragraph 65, EPA may, in its unreviewable discretion, excuse in writing Mosaic's failure to submit timely notices under this Paragraph.

67. If EPA, after consultation with LDEQ, agrees that the delay or anticipated delay is attributable to a force majeure event, the time for performance of the obligations under this Consent Decree that are affected by the force majeure event will be extended by EPA, after consultation with LDEQ, for such time as is necessary to complete those obligations. An extension of the time for performance of the obligations affected by the force majeure event shall not, of itself, extend the time for performance of any other obligation. If EPA, after consultation

with LDEQ, agrees that the delay is attributable to a force majeure event, EPA will notify Mosaic in writing of the length of the extension, if any, for performance of the obligations affected by the force majeure event.

68. If EPA, after consultation with LDEQ does not agree that the delay or anticipated delay has been or will be caused by a force majeure event, EPA will notify Mosaic in writing of its decision.

69. If Mosaic elects to invoke the dispute resolution procedures set forth in Section XI (Dispute Resolution), it shall do so no later than fifteen (15) Days after receipt of EPA's notice. In any such proceeding, Mosaic shall have the burden of demonstrating by a preponderance of the evidence that the delay or anticipated delay has been or will be caused by a force majeure event, that the duration of the delay or the extension sought was or will be warranted under the circumstances, that best efforts were exercised to avoid and mitigate the effects of the delay, and that Mosaic complied with the requirements of Paragraphs 65 and 66, above. If Mosaic carries this burden, the delay at issue shall not constitute a violation by Mosaic of the affected obligation of this Consent Decree identified to EPA and the Court.

XI. DISPUTE RESOLUTION

70. Unless otherwise expressly provided for in this Consent Decree, the dispute resolution procedures of this Section shall be the exclusive mechanism to resolve all disputes arising under or with respect to this Consent Decree. Mosaic's failure to seek resolution of a disputed issue under this Section shall preclude Mosaic from raising any such issue as a defense to an action by the United States or LDEQ to enforce any obligation of Mosaic arising under this Consent Decree.

71. Informal Dispute Resolution. Any dispute subject to Dispute Resolution under this Consent Decree shall first be the subject of informal negotiations, which may include any third-party assisted, non-binding alternative dispute resolution process agreeable to the Parties. Mosaic shall submit a written Notice of Dispute to both the United States and LDEQ within thirty (30) Days after receiving written notice from EPA of a decision that Mosaic disputes. The dispute shall be considered to have arisen on the later of the dates that the United States or LDEQ receives a written Notice of Dispute. Such Notice of Dispute shall state clearly the matter in dispute. The period of informal negotiations shall not exceed twenty (20) Days from the date that the dispute arises, unless that period is modified by written agreement between the United States and Mosaic. If the Parties cannot resolve a dispute by informal negotiations, then the position of EPA, after consultation with LDEQ, shall be considered binding, unless Mosaic invokes formal dispute resolution procedures as provided in the following Paragraph.

72. Formal Dispute Resolution. If Mosaic elects to invoke formal dispute resolution, Mosaic shall, within thirty (30) Days after the conclusion of the informal negotiation period, submit to EPA and LDEQ a written Statement of Position regarding the matter in dispute. The Statement of Position shall include, but need not be limited to, any factual data, analysis, or opinion supporting Mosaic's position and any supporting documentation relied upon by Mosaic.

73. EPA, after consultation with LDEQ, shall submit its Statement of Position within forty-five (45) Days of receipt of Mosaic's Statement of Position. The EPA Statement of Position shall include or clearly reference, but need not be limited to, any factual data, analysis, or opinion supporting that position and any supporting documentation relied upon by EPA. Where appropriate, EPA may allow submission of supplemental statements of position by the

Parties to the dispute. The EPA Statement of Position shall be binding on Mosaic unless Mosaic files a motion for judicial review of the dispute in accordance with the following Paragraph.

74. Unless expressly stated otherwise in this Consent Decree, Mosaic may seek judicial review of the dispute by filing with the Court and serving on the United States and LDEQ, in accordance with Section XV (Notices) of this Consent Decree, a motion requesting judicial resolution of the dispute. The motion must be filed within thirty (30) Days of receipt of the EPA Statement of Position pursuant to the preceding Paragraph. The motion shall contain a written statement of Mosaic's position on the matter in dispute, including any supporting factual data, analysis, opinion, or documentation, and shall set forth the relief requested and any schedule within which the dispute must be resolved for orderly implementation of the Consent Decree.

75. The United States, after consultation with LDEQ, shall respond to Mosaic's motion within the time period allowed by the Local Rules of this Court. Mosaic may file a reply memorandum, to the extent permitted by the Local Rules.

76. Standard of Review

(a) Disputes Concerning Matters Accorded Record Review. In any dispute brought under this Section pertaining to the adequacy or appropriateness of plans, procedures to implement plans, schedules or any other items requiring approval by EPA under this Consent Decree; the adequacy of the Work performed pursuant to this Consent Decree; and all other disputes that are accorded review on the administrative record under applicable principles of administrative law, EPA shall compile an administrative record of the dispute containing all Statements of Position, including supporting documentation and referenced data or information,

and Mosaic shall have the burden of demonstrating, based on the administrative record, that the position of the United States is arbitrary and capricious or otherwise not in accordance with law.

(b) In any other dispute brought under this Section, Mosaic shall bear the burden of demonstrating that its position complies with and furthers the objectives of this Consent Decree.

77. The invocation of dispute resolution procedures under this Section shall not, by itself, extend, postpone, or affect in any way any obligation of Mosaic under this Consent Decree, unless and until final resolution of the dispute so provides or unless ordered by the Court. Stipulated penalties with respect to the disputed matter shall continue to accrue from the first Day of noncompliance, but payment shall be stayed pending resolution of the dispute as provided in Paragraph 72. If Mosaic does not prevail on the disputed issue, stipulated penalties shall be assessed and paid as provided in Section IX (Stipulated Penalties).

XII. INFORMATION COLLECTION AND RETENTION

78. The United States, LDEQ, and their representatives, including attorneys, contractors, and consultants, shall have the right of entry into any of Mosaic's Louisiana Facilities, at all reasonable times, upon presentation of appropriate identification, to:

- (a) monitor the progress of activities required under this Consent Decree;
- (b) verify any data or information submitted to the United States or LDEQ in accordance with the terms of this Consent Decree;
- (c) obtain samples and, upon request, splits of any samples taken by Mosaic or its representatives, contractors, or consultants;
- (d) obtain documentary evidence, including photographs and similar data;
- (e) assess Mosaic's compliance with this Consent Decree; and

(f) conduct, direct or review Work pursuant to Section VI (Work Takeover) of this Consent Decree.

79. Upon request, Mosaic shall provide EPA, LDEQ and their authorized representatives splits of any samples taken by Mosaic. Upon request, EPA and LDEQ shall provide Mosaic splits of any samples taken by EPA, LDEQ, and their authorized representatives.

80. Mosaic shall retain, and shall require its contractors and agents to preserve, all non-identical copies of all documents, records, or other information (including documents, records, emails or other information in electronic form and including any documents, records, data or other information underlying the submission of any Report required pursuant to Section VIII (Reporting Requirements)) in its or its contractors or agents possession or control, or that come into its or its contractors' or agents' possession or control and that relate to Mosaic's performance of its obligations under this Consent Decree or adherence to the requirements associated with the management of waste materials allowed under Paragraphs 15 through 18 for a period of five (5) years after the creation of such documents, records or other information. This information-retention requirement shall apply regardless of any contrary corporate or institutional policies or procedures. At any time during this information-retention period, upon request by the United States or LDEQ, Mosaic shall provide copies of any documents, records, or other information required to be maintained under this Paragraph.

81. At the conclusion of the information-retention period provided in the preceding Paragraph, Mosaic shall notify the United States and LDEQ at least ninety (90) Days prior to the destruction of any documents, records, or other information subject to the requirements of the preceding Paragraph and, upon request by the United States or LDEQ, Mosaic shall deliver any such documents, records, or other information to EPA or LDEQ. Mosaic shall not dispose of

materials following the expiration of its five (5) year retention period more often than once a year.

82. In connection with any request for documents, records, or other information pursuant to this Consent Decree, Mosaic may assert that certain documents, records, or other information are privileged under the attorney-client privilege or any other privilege recognized by federal law, provided that Mosaic shall not assert a legal privilege for any data, records or information (excluding legal advice) generated or received in connection with Mosaic's obligations pursuant to the requirements of this Consent Decree. If Mosaic asserts a privilege, it shall provide the following: (1) the title of the document, record, or information; (2) the date of the document, record, or information; (3) the name and title of each author of the document, record, or information; (4) the name and title of each addressee and recipient; (5) a description of the subject of the document, record, or information; and (6) the privilege asserted by Mosaic. If Plaintiffs and Mosaic disagree as to whether a particular document or record is privileged, Mosaic shall deliver such document or record to the United States or LDEQ unless it invokes dispute resolution pursuant to Section XI (Dispute Resolution), in which case, Mosaic shall not have an obligation to deliver such document or record until a final determination is made, pursuant to the procedures set forth in Section XI (Dispute Resolution), that such document or record is not privileged.

83. Mosaic may also assert that information provided pursuant to this Consent Decree is protected as Confidential Business Information ("CBI") under the criteria and procedures set forth in 40 C.F.R. Part 2 or LAC 33:I.Chapter 5, provided that: (a) Mosaic shall not assert a CBI claim with respect to any physical, sampling, monitoring, or analytical data other than data related to: (i) development of new or modified products; (ii) development of new or modified

production processes; (iii) production materials or analyses collected for quality control or other manufacturing purposes; or (iv) analyses undertaken for competitive business purposes; and (b) Mosaic shall not assert a CBI claim for Financial Assurance information required to be provided pursuant to Paragraphs 10.e, 15(e) and 32 of Appendix 2 of this Consent Decree. If Mosaic claims any information related to Financial Assurance submissions and Cost Estimates is CBI, Mosaic shall submit two versions, one version with the CBI material redacted, and so identified in the document, which will be publicly available, and the second version will contain the CBI material.

84. This Consent Decree in no way limits or affects any right of entry and inspection, or any right to obtain information, held by the United States or LDEQ pursuant to applicable federal or Louisiana laws, regulations, or permits, nor does it limit or affect any duty or obligation of Mosaic to maintain documents, records, or other information imposed by applicable federal or Louisiana laws, regulations, or permits.

XIII. EFFECT OF SETTLEMENT/RESERVATION OF RIGHTS

85. This Consent Decree resolves the civil claims of the United States and LDEQ against Mosaic and, as to liability arising out of Mosaic's liability only, The Mosaic Company for the violations at the Facilities alleged in the Complaint filed in this action through the date of the lodging of the Consent Decree. This Consent Decree also resolves such claims, if any, of the United States and LDEQ against the corporate officers, directors, and employees, acting in their capacities as such, of Mosaic or The Mosaic Company, but only as to liability arising out of Mosaic's liability. For continuing violations alleged in the Complaint, provided that Mosaic complies with this Consent Decree at a Facility, as set forth in Paragraph 87, from the date of lodging of the Consent Decree through its Effective Date, these claims shall also be resolved

through the Effective Date of this Consent Decree, as of the Effective Date, for that Facility; and, provided that Mosaic complies with the Consent Decree at a Facility from the Effective Date of this Consent Decree through the date of termination of this Consent Decree for that Facility pursuant to Section XIX (Termination), these claims shall be finally resolved as of the date the Consent Decree terminates for that Facility.

86. Provided that Mosaic is in compliance with this Consent Decree, and subject to the reservation below, Plaintiffs covenant not to sue or take administrative action, under Section 3008(a) of RCRA, 42 U.S.C. § 6928(a) or a state law counterpart, seeking to require Mosaic's Facilities to comply with the RCRA Requirements, with respect to: (a) the generation, treatment, storage, transport, management, and disposal of Bevill-Exempt Wastes that have been commingled with hazardous wastes or otherwise managed in violation of law as alleged in the Complaint, and that are resolved in accordance with Paragraph 85; (b) wastes that Paragraphs 15 through 18 of this Consent Decree allow to be input to Upstream Operations or Downstream Operations or managed in BHT Recovery Units, IGPUs, GPUs, Granulation Sump Ditches or with Bevill-Exempt Wastes; and (c) conditions addressed under Paragraphs 23 and 24. Further, provided that Mosaic is in compliance with this Consent Decree, LDEQ covenants not to sue or take administrative action seeking to require the Phosphogypsum Stack System at Mosaic's Uncle Sam Facility to comply with otherwise applicable requirements of the Louisiana Solid Waste Management and Resource Recovery Law (La. R.S. 30:2151 et seq.) and the regulations promulgated thereunder (LAC 33:VII, Subpart 1). (The interface of the Louisiana Solid Waste Management and Resource Recovery Law (La. R.S. 30:2151 et seq.) and the regulations promulgated thereunder (LAC 33:VII, Subpart 1) and Defendant's obligations under this Consent Decree is further addressed in the letter from LDEQ dated September 29, 2015.)

Nothing in this Paragraph, however, shall affect Plaintiffs' rights to determine and require necessary Corrective Action Work in accordance with Paragraphs 21 and 22(a)(1), respectively, of this Consent Decree, or to restrict Non-CD Corrective Action that may be required at a Facility pursuant to Plaintiffs' residual authorities under federal, state, and local laws.

87. The resolution under this Section XIII (Effect of Settlement/Reservation of Rights) of the Plaintiffs' civil claims set forth in the Complaint and the Plaintiffs' covenants not to sue are expressly conditioned upon Mosaic's timely and satisfactory compliance with the requirements of this Consent Decree. For the purposes of this Paragraph (and Paragraphs 85 and 86), and with respect to the wastes that Paragraphs 15 through 18 allow to be input to Upstream Operations or Downstream Operations, managed in BHT Recovery Units, IGPU's, GPU's, Granulation Sump Ditches, or with Bevill-Exempt Wastes, compliance with the Continuing Compliance Criteria set forth in Paragraph 32 constitutes compliance with this Consent Decree.

88. The United States and LDEQ reserve all legal and equitable remedies available to enforce the provisions of this Consent Decree, and Mosaic reserves all legal and equitable defenses available to it in the defense of any such enforcement. This Consent Decree shall not be construed to limit the rights of the United States or LDEQ to obtain penalties or injunctive relief under the federal and Louisiana environmental statutes or their implementing regulations, or under other federal or Louisiana law regulations or permit conditions, including Section 3008(h) of RCRA, 42 U.S.C. § 6928(h), except as expressly specified in Paragraphs 85 and 86, and Mosaic in any such action shall not assert any defense based upon the contention that such claims raised by the Plaintiffs were or should have been brought in the instant case under principles of waiver, res judicata, collateral estoppel, issue preclusion, claim preclusion, claim-splitting, or other such defenses. The United States and LDEQ further retain all authority and

reserve all rights to take any and all actions authorized by law to protect human health and the environment, including Corrective Action Work and Non-CD Corrective Action, and all legal and equitable remedies to address any imminent and substantial endangerment to the public health or welfare or the environment arising at, or posed by, Mosaic's Facilities, whether related to the violations addressed in this Consent Decree or otherwise.

89. This Consent Decree is not a permit, or a modification of any permit, under any federal, State, or local law or regulation. While this Consent Decree resolves the Parties' dispute regarding the violations alleged in the Complaint as set forth in Paragraph 85, compliance with the terms of this Consent Decree does not guarantee compliance with all applicable federal, State, or local laws or regulations. Except as provided in Paragraphs 34, 85, and 86 of this Consent Decree, Mosaic is not relieved of its obligation to achieve and maintain compliance with all applicable federal, State, and local laws, regulations, and permits; Mosaic's compliance with this Consent Decree shall be no defense to any action commenced by Plaintiffs pursuant to any such law, regulation, or permit, except as expressly specified in Paragraphs 34, 85 and 86.

90. This Consent Decree does not limit or affect the rights of the Parties against any third-parties (persons not a Party to this Consent Decree), nor does it limit the rights of third-parties except as otherwise provided by the doctrine of federal preemption or by other applicable principles of law or precedent.

91. This Consent Decree shall not be construed to create rights or obligations in, or grant any cause of action to, any third-party.

92. Nothing in the Complaint filed in this action or in this Consent Decree, including the execution and implementation of this Consent Decree, shall constitute an admission by Mosaic of any violation of the RCRA Requirements or of any of the allegations of the

Complaint. Mosaic reserves all rights to dispute the factual and legal representations of the Complaint and Consent Decree except in an action to enforce this Consent Decree by a Party. The terms of this Consent Decree may not be used as evidence in any litigation between the Parties except (a) pursuant to Section XI (Dispute Resolution), (b) in an action to enforce this Consent Decree, or (c) in an action by Plaintiffs in which Mosaic asserts a defense based on this Consent Decree.

XIV. COSTS

93. The Parties shall bear their own costs of this action, including attorneys' fees, except that the United States and LDEQ shall be entitled to collect costs (including attorneys' fees) incurred in any action necessary to access Financial Assurance pursuant to Paragraph 25 and Appendix 2 (Financial Assurance) of this Consent Decree, or to collect any portion of the civil penalty or any stipulated penalties or other costs due under this Consent Decree but not paid by Mosaic.

94. LDEQ Costs Incurred in Oversight of Consent Decree.

(a) LDEQ may employ, arrange for, or contract with a qualified person to perform oversight tasks related to the Work performed under this Consent Decree. Mosaic shall bear reasonable and necessary costs incurred by LDEQ for oversight related to the Work performed under this Consent Decree following the Entry Date and as allowed by law. Following the first anniversary of this Consent Decree, LDEQ may propose to increase the Annual Oversight Cost Cap on an annual basis to reflect cost increases; provided, however, such proposed increase shall not exceed the current inflationary rate for the specific year.

(b) LDEQ shall keep accurate books and accounts of oversight costs. Such books and accounts may be audited by Mosaic upon written request. Annually from the

Effective Date of this Consent Decree, or at the end of each calendar-quarter if deemed appropriate by LDEQ, LDEQ shall submit to Mosaic an invoice for oversight costs that LDEQ asserts are recoverable under Paragraph 94(a). The invoice shall describe for each person and for each day the oversight work for which LDEQ seeks reimbursement in sufficient detail to document the amount of time spent on oversight work and to describe the oversight work performed during the time documented. If Mosaic disagrees with this invoice on the basis that costs incurred by LDEQ are not reasonable, not necessary, or excessive or the invoice fails to provide sufficient information as described above, then Mosaic may invoke Section XI (Dispute Resolution) of this Consent Decree. Mosaic shall, within sixty (60) calendar Days of receiving the invoice, unless it has invoked Section XI (Dispute Resolution) before this 60 Day period has passed, remit a check or electronic payment for the amount of those costs made payable to the Louisiana Department of Environmental Quality. Checks shall specifically reference the Facility and invoice number, and be mailed to the following address:

Accountant Administrator
Financial Services Division
Office of Management and Finance
Louisiana Department of Environmental Quality
P.O. Box 4303
Baton Rouge, LA 70821-4303

Electronic Payments shall specifically reference the Facility and invoice number and can be made to the following:

Bank Name:	JP Morgan Chase
Account Name:	State of Louisiana, Dept. of Environmental Quality
Routing:	XXXXXX021 (ACH) or XXXXXX137 (Fed Wire)
Account Number:	XXXXXX544

A copy of the check or payment confirmation and transmittal letter shall be mailed to:

Cost Recovery Officer
Office of Environmental Compliance
Remediation Services Division
Louisiana Department of Environmental Quality
P.O. Box 4314
Baton Rouge, LA 70821-4314

This Paragraph shall not prejudice LDEQ's right to bring an action against any party, including Mosaic, under the Comprehensive Environmental Response, Compensation, and Recovery Act (CERCLA) for recovery of any future costs incurred by LDEQ related to this Consent Decree and not reimbursed by Mosaic.

XV. NOTICES

95. Unless otherwise specified herein, whenever notifications, submissions, or communications are required by this Consent Decree in accordance with Section VIII (Reporting Requirements) they shall be made electronically, unless otherwise requested by either LDEQ or EPA, and addressed as follows:

To the United States:

Chief, Environmental Enforcement Section
Environment and Natural Resources Division
U.S. Department of Justice
Re: DOJ No. 90-7-1-[08388]

To Deborah Reyher:

via email:
Deborah.Reyher@usdoj.gov

via facsimile:
(202) 514-4113 or (202) 514-0097
via regular mail or post office express mail:
Box 7611 Ben Franklin Station
Washington, D.C. 20044-7611

via private overnight service:

601 D Street, NW, 2nd Floor
Washington, D.C. 20004

United States Attorney for the Eastern District of Louisiana
Hale Boggs Federal Building
500 Poydras Street, Suite 210
New Orleans, Louisiana 70130
Phone: (504) 680-3000
Fax: (504) 589-4661

and to EPA, below.

To EPA:

Associate Director
Hazardous Waste Enforcement Branch
U.S. Environmental Protection Agency,
Region 6
1445 Ross Avenue, Suite 1200
Dallas, TX 75202-2733
Phone: (214) 665-6746
Fax: (214) 665-2182

Van Housman and Bethany Russell
Office of Civil Enforcement
Mail Code 2249A
U.S. Environmental Protection Agency
Clinton Building-South
1200 Pennsylvania Ave., NW
Washington, D.C. 20460
Phone: (202) 564-1849
Fax: (202) 564-0019
Housman.van@epa.gov
russell.bethany@epa.gov

To LDEQ:

Celena J. Cage
Administrator
LDEQ Office of Environmental Compliance-Enforcement Division
Post Office Box 4312
Baton Rouge, LA 70821-4312
Phone: 225 219-3715
Fax: 225- 325-8142
celena.cage@la.gov

Lewis Donlon
Administrator
LDEQ Waste Permits Division
P.O. Box 4313
Baton Rouge, LA 70821-4313
Phone: 225-219-3393
Fax: 225-219-3474
Dutch.donlon@la.gov

Kathy M. Wright and Perry Theriot
Office of the Secretary
Legal Affairs Division
Louisiana Dept. of Environmental Quality
P.O. Box 4302
Baton Rouge, Louisiana 70821-4302
Phone: (225) 219-3985
Fax: (225) 219-4068
Kathy.wright@la.gov
Perry.theriot@la.gov

To Mosaic and the Mosaic Company:

David Jellerson
Senior Director of Environmental
Mosaic Fertilizer, LLC
13830 Circa Crossing Drive
Lithia, FL 33547

Patrick van der Voorn
The Mosaic Company on behalf of Mosaic Fertilizer, LLC
Senior Environmental Counsel
Atria Corporate Center, Suite E490
3033 Campus Drive
Plymouth, MN 55441

To Arnold & Porter LLP (Counsel for Mosaic):

Joel M. Gross
Lester Sotsky
Peggy Otum
Eric Rey
Arnold & Porter LLP
555 Twelfth Street, N.W.
Washington, DC 20004-1206

96. Any Party may, by written notice to the other Parties, change its designated notice recipient or notice address provided above.

97. Notices submitted pursuant to this Section shall be deemed submitted upon electronic transmission, unless otherwise provided in this Consent Decree or by mutual agreement of the Parties in writing.

XVI. EFFECTIVE DATE

98. The Entry Date of this Consent Decree shall be the date of a Final Order by which this Consent Decree is entered by the Court or by which a motion to enter the Consent Decree is granted, whichever occurs first, as recorded on the Court's docket. The Effective Date of this Consent Decree shall be the later of the Entry Date of this Consent Decree or the Entry Date of the Consent Decree resolving claims by the United States and the Florida Department of Environmental Protection against Mosaic relating to Mosaic's facilities in Florida. The filing or pendency of an appeal of the Court's entry of this Consent Decree shall not stay the Effective Date, except as may be otherwise determined pursuant to Paragraph 100 (Modification). In the event that either Consent Decree is not entered by the Court, the Parties shall jointly stipulate to stay any previously entered Consent Decree. Notwithstanding the foregoing, Mosaic hereby agrees that it shall be bound from the date of its execution of this Consent Decree to perform obligations scheduled in this Consent Decree to occur prior to the Effective Date.

XVII. RETENTION OF JURISDICTION

99. The Court shall retain jurisdiction over this case until termination of this Consent Decree for both Facilities, pursuant to Section XIX (Termination), for the purpose of resolving disputes arising under this Consent Decree (including disputes under any Trust Agreements

entered pursuant hereto) or entering orders modifying this Consent Decree, pursuant to Sections XI (Dispute Resolution) and XVIII (Modification), or effectuating or enforcing compliance with the terms of this Consent Decree.

XVIII. MODIFICATION

100. The terms of this Consent Decree may be modified only by a subsequent written agreement of the Parties to this Consent Decree as set forth herein. Any modifications to the provisions of Appendices 1 through 7, hereto and any other modifications to any other provisions of this Consent Decree that do not constitute a material change to this Consent Decree may be made without approval by the Court upon written agreement between Mosaic and the United States, after consultation with LDEQ. Any modifications to the provisions of Appendix 8 may be made without approval by the Court upon written agreement between Mosaic and LDEQ, after consultation with the United States. Any such changes shall become enforceable under this Consent Decree upon execution by Mosaic and the United States (for changes to the Consent Decree or Appendices 1 through 7) or Mosaic and LDEQ (for changes to Appendix 8), shall be made available to the public by EPA and LDEQ (except to the extent such changes contain information determined to be CBI pursuant to Paragraph 83 and 40 C.F.R. Part 2), and shall periodically be filed by EPA or LDEQ with the Court. Any other modifications agreed to by the Parties shall be effective only upon approval by the Court. Except as otherwise provided in this Paragraph and in Paragraph 102, a Party's refusal to agree to a modification of this Consent Decree shall be subject to dispute resolution, but a Party seeking judicial review of such a refusal shall bear the burden of demonstrating that it is entitled to the requested modification based on a significant change in factual conditions or the law or other reason that would make inequitable the continued application of the Consent Decree without the modification sought.

101. In the event that a potential transferee under Section II (Applicability) of this Consent Decree has agreed to become a party to this Consent Decree and subject to all its terms and provisions, it may do so upon written approval of the United States pursuant to Section II (Applicability) of this Consent Decree and Section XVIII (Modification), without further order from the Court, in which event a supplemental signature page will be affixed to this Consent Decree and filed with the Court.

XIX. TERMINATION

102. Periodic Review of Work Status. At least once every three (3) years, and more often if the Parties so agree, the Parties shall meet to review the status of the Work and to evaluate whether discrete portions of the Work have either been completed or may be accomplished and supervised under an EPA or LDEQ administrative order or permit in lieu of this Consent Decree. If all Parties agree to such a modification, such agreement shall be memorialized in a written modification to this Consent Decree pursuant to Section XVIII (Modification) and shall not require judicial approval. If the Parties agree that such modifications allow this Consent Decree to be terminated as to one or both Facilities, the Parties shall submit, for the Court's approval, a joint stipulation terminating the Consent Decree for the relevant Facilities. The Parties' inability to reach an agreement under this Paragraph shall not be subject to dispute resolution or judicial review.

103. Completion of Work. Within ninety (90) Days after Mosaic concludes that all Work required under this Consent Decree has been fully performed at a Facility, EPA and/or LDEQ may conduct an inspection of the Facility to be attended by EPA, LDEQ and Mosaic at a mutually agreeable time. Following the inspection, and correction of any problems or deficiencies noted by EPA, after consultation with LDEQ, Mosaic shall submit one or more

written reports by a third-party registered professional engineer in the relevant technical field, certifying compliance with Section V (Compliance Requirements) of this Consent Decree that the Work has been completed in full satisfaction of the requirements of this Consent Decree. The reports shall indicate the case name and civil action number, and shall be submitted, together with a request for Acknowledgment of Completion, in accordance with Section VIII (Reporting Requirements) of this Consent Decree. Third-party engineer certification of any of the written reports may be waived at EPA's discretion, after consultation with LDEQ.

104. If, after review of the written report(s) and certification and consultation with LDEQ, EPA determines that any portion of the Work has not been completed in accordance with this Consent Decree, EPA will notify Mosaic in writing of the activity(ies) and/or obligation(s) that must be undertaken to complete the Work. EPA will set forth in the notice a schedule for performance of the activity(ies) and/or obligation(s) required under the Consent Decree, or will require Mosaic to submit a schedule for EPA approval pursuant to Section V (Compliance Requirements) of this Consent Decree. Mosaic shall perform all activities described in the notice in accordance with the specifications and schedules established therein, subject to Mosaic's right to invoke the dispute resolution procedures set forth in Section XI (Dispute Resolution) of this Consent Decree.

105. If EPA concludes, based on the initial or any subsequent request for an Acknowledgment of Completion by Mosaic, and after reasonable opportunity for review and comment by LDEQ, that the Work has been fully performed in accordance with this Consent Decree, EPA will so notify Mosaic in writing, which notice shall constitute the Acknowledgment of Completion.

106. Termination. After Mosaic has completed the requirements set forth in Paragraphs 102 and 103 of this Section, has obtained an Acknowledgment of Completion, has complied with all other requirements of this Consent Decree, and has paid the civil penalty and any accrued stipulated penalties as required by this Consent Decree, Mosaic may serve upon the United States and LDEQ a Request for Termination, stating that Mosaic has satisfied those requirements, together with all necessary supporting documentation. A Request for Termination may address one or both of Mosaic's Facilities.

107. Following receipt by the United States and LDEQ of Mosaic's Request for Termination, the Parties shall confer informally concerning the Request and any disagreement that the Parties may have as to whether Mosaic has satisfactorily complied with the requirements for termination of this Consent Decree. If the United States, after consultation with LDEQ agrees that the Consent Decree may be terminated for one or both Facilities, the Parties shall submit, for the Court's approval, a joint stipulation terminating the Consent Decree as to the relevant Facilities.

108. If the United States, after consultation with LDEQ, does not agree that the Consent Decree may be terminated as to one or both Facilities, Mosaic may invoke Dispute Resolution under Section XI (Dispute Resolution) of this Consent Decree. However, all time periods and deadlines established under Section XI (Dispute Resolution) shall be extended by sixty (60) Days, or more by the agreement of the Parties.

XX. PUBLIC PARTICIPATION

109. This Consent Decree shall be lodged with the Court for a period of not less than forty-five (45) Days for public notice and comment in accordance with 28 C.F.R. § 50.7 and La R.S. 30:2050.7. The United States reserves the right to withdraw or withhold its consent if the

comments regarding the Consent Decree disclose facts or considerations indicating that the Consent Decree is inappropriate, improper, or inadequate. Mosaic and The Mosaic Company consent to entry of this Consent Decree without further notice and agree not to withdraw from or oppose entry of this Consent Decree by the Court or to challenge any provision of the Consent Decree, unless the United States has notified Mosaic in writing that it no longer supports entry of the Consent Decree. Further, the parties agree and acknowledge that final approval by LDEQ and entry of this Consent Decree is subject to the requirements of LA. R.S. 30:2050.7, which provides for public notice of this Consent Decree in the newspapers of general circulation and the official journal of the parish in which the Facilities are located, an opportunity for public comment, consideration of any comments, and concurrence by the State of Louisiana Attorney General. Evidence of final approval of this Consent Decree by LDEQ shall be LDEQ's execution of a Motion to Enter this Consent Decree. LDEQ reserves the right to withdraw or withhold consent and will not join in the filing of a Motion to Enter this Consent Decree if the state Attorney General raises objections or if comments regarding this Consent Decree disclose facts or considerations which indicate that this Consent Decree is inappropriate, improper or inadequate.

XXI. SIGNATORIES/SERVICE

110. Each undersigned representative of Mosaic and The Mosaic Company, the Assistant Attorney General for the Environment and Natural Resources Division of the Department of Justice, or her designee, and the Secretary of the Louisiana Department of Environmental Quality certifies that he or she is fully authorized to enter into the terms and conditions of this Consent Decree and to execute and legally bind the Party he or she represents to this document. The undersigned Attorney General of Louisiana is authorized to and as

evidenced either by his signature below or his concurrence letter communicated to LDEQ concurs in the entry of this Consent Decree.

111. This Consent Decree may be signed in counterparts, and its validity shall not be challenged on that basis. Mosaic and The Mosaic Company agree to accept service of process by mail with respect to all matters arising under or relating to this Consent Decree and to waive the formal service requirements set forth in Rules 4 and 5 of the Federal Rules of Civil Procedure and any applicable Local Rules of this Court including, but not limited to, service of a summons.

XXII. INTEGRATION

112. This Consent Decree and its Appendices constitute the final, complete, and exclusive agreement and understanding among the Parties with respect to the settlement embodied in the Consent Decree and supersedes all prior agreements and understandings, whether oral or written, concerning the settlement embodied herein. Other than the Appendices, which are attached to and incorporated in this Consent Decree, no other document, nor any representation, inducement, agreement, understanding, or promise, constitutes any part of this Consent Decree or the settlement it represents, nor shall it be used in construing the terms of this Consent Decree.

XXIII. FINAL JUDGMENT

113. Upon approval and entry of this Consent Decree by the Court, this Consent Decree shall constitute a final judgment of the Court as to the United States, LDEQ, Mosaic and The Mosaic Company. The Court finds that there is no just reason for delay and therefore enters this judgment as a final judgment under Fed. R. Civ. P. 54 and 58.

XXIV. APPENDICES

114. The following Appendices are attached to and part of this Consent Decree:

Appendix 1 contains the following compliance requirements:

Attachment A (Site Assessment, Reporting, and Corrective Action);

Attachment B (Annual Groundwater Requirements);

Attachment C (Phosphogypsum Stack System Construction and Operational Requirements);

Attachment D (Closure of Phosphogypsum Stacks/Stack Systems);

Attachment E (Critical Conditions and Temporary Measures);

Attachment F (Definitions for Purpose of the Consent Decree);

Attachment G (Phosphogypsum Stack System Closure Application);

Appendix 2 establishes Financial Assurance Requirements;

Attachment A (CFO Certification);

Attachment B (Annual Submittal of Phosphogypsum Stack System Closure and Long Term Care Cost Estimate);

Attachment C (Summary Costs for Phosphogypsum Stack System Closure and Long Term Care);

Attachment D (Financial Mechanisms);

Attachment E (Type B Financial Metrics Charts);

Attachment F (Current Configuration of Operating Facilities' Phosphogypsum Stack Systems and Planned Expansions);

Attachment G (Summary of Phosphogypsum Stack System Volumes and Closure Areas);

Attachment H (Guarantor's Representation and Certification);

Attachment I (Executed Phosphogypsum Stack System Closure and Long Term Care Guarantee);

Appendix 3 is the collected Site Maps of the Mosaic Facilities;

Appendix 4 is the Uncle Sam and Faustina Facility Reports;

Appendix 5 is the Mosaic's current BMP Plan;

Appendix 6 is the RCRA Project Narrative and Compliance Schedule;

Appendix 7 is Mosaic's Phosphogypsum Stack System Alternative Liner Compliance Requirements, Exemptions and Conditions for the Uncle Sam Facility; and

Appendix 8 is LDEQ Administrative Order on Consent MM-AOA-14-00269.

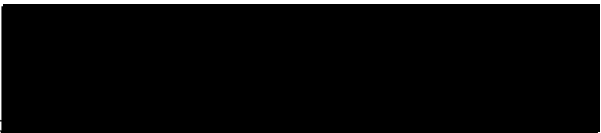
Dated and entered this ___ day of _____, 2015.

UNITED STATES DISTRICT JUDGE
EASTERN DISTRICT OF LOUISIANA

FOR THE UNITED STATES OF AMERICA:


Date:

9/29/15


JOHN C. CRUDEN
Assistant Attorney General
Environment and Natural Resources Division
United States Department of Justice
950 Pennsylvania Avenue, NW
Washington, D.C. 20530

Date:


9/30/15


DEBORAH M. REYHER
Senior Counsel
Environmental Enforcement Section
Environment and Natural Resources Division
United States Department of Justice
P.O. Box 7611, Ben Franklin Station
Washington, D.C. 20044
(202) 514-4113

WE HEREBY CONSENT to the entry of the Consent Decree in United States et al. v. Mosaic Fertilizer, LLC, subject to the public notice requirements of 28 C.F.R. § 50.7.

FOR THE UNITED STATES OF AMERICA:

Date: Sept 29, 2015

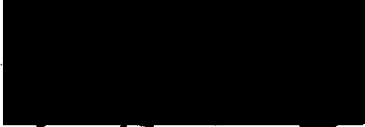

CYNTHIA GILES
Assistant Administrator
Office of Enforcement and Compliance Assurance
United States Environmental Protection Agency
Washington, D.C. 20460

WE HEREBY CONSENT to the entry of the Consent Decree in United States et al. v. Mosaic Fertilizer, LLC, subject to the public notice requirements of 28 C.F.R. § 50.7.

FOR THE UNITED STATES OF AMERICA:


Date:

9/30/2015


RON CURRY
Regional Administrator
U.S. Environmental Protection Agency,
Region 6
1445 Ross Avenue, Suite 1200
Dallas, TX 75202-2733

Date:

9/29/2015


MARCIA MONCRIEFFE
Assistant Regional Counsel
Office of Regional Counsel
U.S. Environmental Protection Agency,
Region 6
1445 Ross Avenue, Suite 1200
Dallas, TX 75202-2733

WE HEREBY CONSENT to the entry of the Consent Decree in United States et al. v. Mosaic Fertilizer, LLC (E.D. La.), a civil action, subject to the public notice and comment requirements of LA. R.S. 30:2050.7.

FOR THE LOUISIANA DEPARTMENT OF ENVIRONMENTAL QUALITY:

Date: 9-29-15



D. CHANCE MONEELY
Assistant Secretary
Office of Environmental Compliance
Louisiana Dept. of Environmental Quality

Date: 9-29-2015




KATHY M. WRIGHT (LA Bar Roll
#30804)
ELLIOTT VEGA (LA Bar Roll # 21397)
PERRY THERIOT (LA Bar Roll #19181)
Office of the Secretary
Legal Affairs Division
Louisiana Dept. of Environmental Quality
P.O. Box 4302
Baton Rouge, Louisiana 70821-4302
Phone: (225) 219-3985
Fax: (225) 219-4068

Mosaic Consent Decree – EPA Region 6 and LDEQ

WE HEREBY CONSENT to the entry of the Consent Decree in United States et al. v. Mosaic Fertilizer, LLC, Civil Action No. _____, subject to the public notice and comment requirements of 28 C.F.R. § 50.7.

FOR MOSAIC FERTILIZER, LLC:

Date: _____


Mark Isaacson
Senior Vice President and Corporate Secretary
Mosaic Fertilizer, LLC

Mosaic Consent Decree – EPA Region 6 and LDEQ

FOR THE MOSAIC COMPANY (as to Sections I (Jurisdiction and Venue), II (Applicability), XI (Dispute Resolution), XIII (Effect of Settlement), XV (Notices), XVI (Effective Date), XVII (Retention of Jurisdiction), XVIII (Modification), XX (Public Participation), XXI (Signatories/Service), XXII (Integration), XXIII (Final Judgment), and Paragraphs 25 and 26 (Financial Assurance)):

Date: _____

A black rectangular redaction box covering a signature. A single diagonal line is visible above the box, likely representing the end of a line of text.

From: [Betancourt, Amaury](#)
To: [DWRMIW.PM](#)
Subject: FW: FL0000752-020 - Mosaic - Green Bay - Courtesy Notice re: Start of Gypsum Transfer to Reactivated Green Bay Stack
Date: Monday, July 26, 2021 10:24:49 AM

Please place in OCULUS:

MMR_FL0000752, Construction-operation-related, Transfer to Operation, "North Gypstack Reactivation".

Thank you,
Amaury

Amaury P. Betancourt, Ph.D., P.E.
Phosphate Management Program
Florida Department of Environmental Protection
W: (813) 470-5905; M: (305) 300-2462
Amaury.Betancourt@FloridaDEP.gov

From: Provenzano, Santino <Santino.Provenzano@mosaicco.com>
Sent: Thursday, July 22, 2021 1:44 PM
To: Sathe, Vishwas <Vishwas.Sathe@dep.state.fl.us>
Cc: Coates, John <John.Coates@FloridaDEP.gov>; Betancourt, Amaury <Amaury.Betancourt@dep.state.fl.us>; D'Abreu, Gordon <Gordon.D'Abreu@dep.state.fl.us>; Lewis, Donovan <Donovan.Lewis@mosaicco.com>; Ford, Dara <Dara.Ford@mosaicco.com>; Wozniak, Matthew <Matthew.Wozniak@mosaicco.com>; SAMANTHA.ANDREWS@mosaicco.com; Williams, Andrea <Andrea.Williams@mosaicco.com>
Subject: FL0000752-020 - Mosaic - Green Bay - Courtesy Notice re: Start of Gypsum Transfer to Reactivated Green Bay Stack

Dear Vishwas:

As verbally requested by the Department yesterday, I am providing courtesy notification that as of 12:21PM on 7/22/2021, we have initiated gypsum transfer from the Bartow facility to the north cell of the newly reactivated Green Bay stack.

If you require any additional information please feel free to contact me.

Thanks



Santino A. Provenzano | Director, Environmental
Mosaic Fertilizer, LLC | Mail: 13830 Circa Crossing Drive, Lithia, FL 33547
P: 813.500.6853 | C: 813.781.1185 | E: santino.provenzano@mosaicco.com | W: www.mosaicco.com

[www.tampabay.com /news/environment/water/mosaic-plant-sinkhole-dumps-215-million-gallons-of-rep...](http://www.tampabay.com/news/environment/water/mosaic-plant-sinkhole-dumps-215-million-gallons-of-rep...)

Mosaic plant sinkhole dumps 215 million gallons of reprocessed water into Floridan Aquifer (w/video)

Christopher O'Donnell : 6-7 minutes : 9/16/2016

Published Sept. 16, 2016

MULBERRY

A massive sinkhole that opened underneath a gypsum stack at a Mosaic phosphate fertilizer plant in Mulberry may have dumped at least 215 million gallons of contaminated water into the Floridan Aquifer over the past three weeks, company officials say.

And it could be months before the hole is plugged, the officials acknowledge.

The 45-foot-wide sinkhole opened at the New Wales plant, where phosphate rock mined elsewhere is converted into fertilizer.

It drained millions of gallons of acidic water laced with sulfate and sodium from a pool atop a 120-foot gypsum stack. An unknown amount of gypsum, a fertilizer byproduct with low levels of radiation, also fell into the sinkhole, which is believed to be at least 300 feet deep.

The pond is now drained, but aerial video taken Friday shows polluted water is still seeping from the gypsum stack and plunging like a waterfall into the sinkhole. More contaminated water will leak with every new rainfall until the sinkhole is filled. The acidic level of the water is roughly equivalent to vinegar or lemon juice.

Mosaic workers became aware of the leak when water levels in the pond dropped 2 feet between readings on Aug. 27. They began diverting water from the pond, which can hold up to about 250 million gallons.

Wells were used to monitor groundwater around the sinkhole. No off-site contamination has been detected, Mosaic officials said.

The company notified the Florida Department of Environmental Protection, the U.S. Environmental Protection Agency and Polk County about the leak.

But neither Mosaic nor DEP officials notified the public about the spill.

David Jellerson, senior director of environment and phosphate projects, said Mosaic decided there was no need to alert neighbors — many of whom use well water — because testing has shown that the contamination has not spread from the 1,600-acre site.

The DEP was notified Aug. 28, spokeswoman Dee Ann Miller said. Staffers were on site the next day and are making frequent visits to monitor cleanup efforts.

"The department's focus at this time is on the oversight of Mosaic's first-response efforts in order to safeguard public health and the environment," Miller said in an email.

Mosaic has agreed to pay for the testing of well water at surrounding properties and has received 14 requests so far. Testing will be conducted by a contractor hired by Mosaic and is expected to start next week.

To tackle the contamination in the aquifer, Mosaic is using a recovery well that pumps 3,500 gallons of water per minute from the aquifer back to the surface, where it will be reused for phosphate processing.

"We're confident the recovery well is effectively collecting the contaminants," Jellerson said.

Water in the aquifer is laden with sand and sediment and flows slowly. Nonetheless, extracting all of the contaminated water and sediment before it spreads will be extremely difficult, said Robert Brinkmann, a professor of geology and environmental sustainability at Hofstra University and author of *Florida Sinkholes: Science and Policy*.

Keep up with Tampa Bay's top headlines

Subscribe to our free DayStarter newsletter

We'll deliver the latest news and information you need to know every morning.



You're all signed up!

Want more of our free, weekly newsletters in your inbox? **Let's get started.**

[Explore all your options](#) ➔

"That's the bad thing about this: The aquifer is like Swiss cheese and it's interconnected," Brinkmann said. "Contamination can be very rapid. They must be working very hard to figure out where this is going."

Longer term, Mosaic will likely fill the sinkhole with a concrete-like grout and repair the heavy-duty plastic liner beneath the gypsum stack.

First, though, it will have to drop sonarlike equipment into the hole to map its dimensions.

It isn't yet known whether the DEP will insist that Mosaic remove phosphogypsum from the sinkhole before filling it or whether Mosaic will face fines for the spill.

"Once the initial response phase is complete, we will have a more complete understanding of all circumstances surrounding the event," Miller said. "At that time, we will turn our attention to determining the best next steps in DEP's enforcement process."

The incident hasn't affected the plant's daily operations. It produces roughly 4 million tons a year of fertilizer and animal feed.

But the spill has angered environmentalists, who question Mosaic's ability to prevent the leak from contaminating the aquifer beyond Mosaic's property line.

"We don't know how deep the monitoring wells are," said Andy Mele, conservation chairman for the Sierra Club's Manatee-Sarasota group. "I trust nothing that Mosaic says."

Mosaic has run afoul of environmental regulators before.

Last October, it agreed to pay nearly \$2 billion to settle a federal lawsuit over hazardous waste and to clean up operations at six Florida sites and two in Louisiana.

The EPA said it had discovered Mosaic employees were mixing highly corrosive substances from its fertilizer operations with the solid waste and wastewater from mineral processing, in violation of federal and state hazardous waste laws.

The sinkhole is the second to open at the New Wales plant, following a 120-foot-wide one in 1994 at a different section of the facility.

At that time, the plant was owned by IMC, which became Mosaic after merging with Cargill. It cost IMC about \$7 million to remediate the site, according to a *Sarasota Herald-Tribune* report.

The same approach of pumping water out of the aquifer was used then and was successful, Jellerson said.

Still, a second potential contamination of the aquifer shows that phosphate production puts water supplies at risk, said Tania Galloni, managing attorney for the Florida Office of Earthjustice, an environmental nonprofit group.

"These phosphate companies are playing roulette with our public waters," Galloni said. "They cause devastation so severe that the scars can be seen clearly from space."

Contact Christopher O'Donnell at codonnell@tampabay.com or (813) 226-3446. Follow @codonnell_Times.

PHASE IV GYPSUM STACK EXTENSION



**Mosaic Fertilizer, LLC
New Wales Facility
Polk County, Florida**

FDEP CONSTRUCTION/OPERATION PERMIT APPLICATION AND SUPPORTING ENGINEERING REPORT

VOLUME I

Prepared by

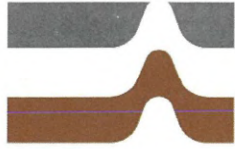


Ardaman & Associates, Inc.

Geotechnical, Environmental and
Materials Consultants

February 2024

APPX ATT_V4_1883

**Ardaman & Associates, Inc.**Geotechnical, Environmental and
Materials ConsultantsFebruary 15, 2024
File Number: 21-13-0122Mosaic Fertilizer, LLC
13830 Circa Crossing Drive
Lithia, FL 33547Attention: Mr. Nevin Maga | General Manager
Mr. Ghadi Mechleb | Manager EngineeringSubject: FDEP Construction/Operation Permit Application and Supporting Engineering Report
Phase IV Gypsum Stack Extension, New Wales Plant, Polk County, Florida
Mosaic Fertilizer, LLC

Ladies and Gentlemen:


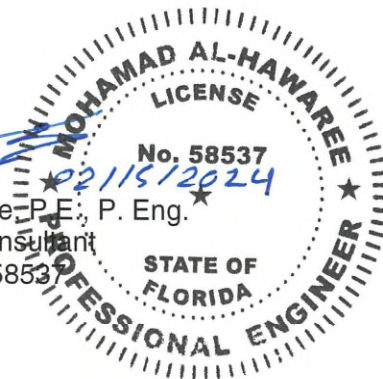
Ardaman & Associates, Inc. has completed the attached engineering report in support of the FDEP construction/operation permit application for the New Wales Plant Phase IV Gypsum Stack Extension. The Phase IV Extension will consist of an approximately 224-acre lined addition to the existing South Gypsum Stack (Phase I/II) and Phase III Extension. The engineering report presents: an overview of the existing New Wales phosphogypsum stack system and performance of the existing South Gypsum Stack and Phase III Extension (Section 1); facility and area information (Section 2); key design features of the Phase IV Extension and control and performance monitoring systems (Section 3); the results of field geotechnical and geophysical explorations undertaken to evaluate subsurface conditions relevant to the potential for sinkhole development (Section 4 and Section 5); the results of geotechnical laboratory testing (Section 6); design criteria, construction provisions and technical specifications (Section 7 and Section 10); operation, groundwater monitoring and surface water monitoring plans (Section 8); and a general closure plan and closure cost estimate (Section 9).

The Phase IV Extension has been designed in general accordance with Florida Administrative Code Chapter 62-673 "Phosphogypsum Management" and Chapter 62-672 "Minimum Requirements for Dikes Used in Phosphogypsum Stack System Impoundments." The engineering report has been prepared in accordance with generally accepted geotechnical engineering practices for the exclusive use of Mosaic Fertilizer, LLC for specific application to the Phase IV Extension. No other warranty, expressed or implied, is made.

We trust that the application and supporting engineering report meet your current planning and permitting requirements. Please contact either of the undersigned if you have any questions or require additional information.

Very truly yours,
ARDAMAN & ASSOCIATES, INC.
Florida Certificate of Authorization No. 5950
Thomas S. Ingra, P.E.
Senior Consultant
Jose Alejandro Arvelo, P.E.
Senior Project EngineerTSI/AA/MAH/aa
Encls

This item has been electronically signed and sealed by Mohamad Al-hawaree on the date adjacent to the seal using a SHA authentication code.
Printed copies of this document are not considered signed and sealed and the SHA authentication code must be verified on any electronic copies.


Mohamad Al-hawaree, P.E., P. Eng.
President, Senior Consultant
Florida License No. 58537

8008 S. Orange Avenue (32809), Post Office Box 593003, Orlando, Florida 32859-3003 Phone: (407) 855-3860 Fax: (407) 859-8121

Florida: Bartow, Cocoa, Fort Myers, Miami, Orlando, Port St. Lucie, Sarasota, Tallahassee, Tampa, West Palm Beach

Louisiana: Baton Rouge, New Orleans, Shreveport

Texas: Houston

MOHAMAD AL-HAWAREE APPX ATT V4_1384 signed by MOHAMAD AL-HAWAREE
Date: 2024.02.15 21:08:42 -05'00'



PHOSPHOGYPSUM STACK SYSTEM CONSTRUCTION/OPERATION PERMIT APPLICATION

PART I - INSTRUCTIONS

Phosphogypsum Stack Systems shall be permitted pursuant to Sections 403.087 and 403.707, Florida Statutes, and in accordance with Rule Chapter 62-673, Florida Administrative Code. A minimum of four copies of the application shall be submitted to the appropriate Department District Office. Complete appropriate sections for the type of facility for which application is made. Entries should be typed or printed in black ink. All blanks should be filled in or marked N/A (not applicable). The application shall include all information, drawings, and reports necessary to evaluate the facility. Information required to support the application is listed on the pages attached to this form.

PART II - GENERAL INFORMATION

- (1) Application for permit to: construct ☒ or operate ☐
Facility type new ☐ lateral expansion ☒
Phosphogypsum stack ☒ Cooling or surge ponds ☐ Perimeter drainage conveyance ☐
Other ☐ specify: _____
- (2) Facility name: Mosaic Fertilizer New Wales Plant - Phase IV Gypsum Stack Extension
- (3) Facility DEP ID No.: 4053P20104
- (4) Facility location (main entrance): 3095 State Road 640 West, Mulberry, Florida 33860-1100
- (5) Location coordinates: Latitude 27 ° 47 ' 54 " Longitude 82 ° 01 ' 44 "
Section 8 Township 31S Range 23E UTM's: Zone 17 398.64 km E 307.53 km N
- (6) Applicant Name (Operating Authority): Mosaic Fertilizer, LLC
Street Address & P. O. Box: 13830 Circa Crossing Drive
City: Lithia County: Hillsborough Zip: 33547
Contact Person: Name Ghadi Mechleb Phone: 813-892-5910
- (7) Authorized Agent/Consultant Name: Ardaman & Associates, Inc
Contact Person Name: Mohamad Al-hawaree, P.E. Phone: 407-855-3860
Street Address & P. O. Box: 8008 South Orange Ave
City: Orlando County: Orange Zip: 32809
Land Owner (if different from applicant): Same as Applicant
Address of Landowner: Street & P. O. Box: _____
City: _____ County: _____ Zip: _____

- (8) Acres within phosphogypsum stack system boundary 1,853 . Acres within property boundary 31,640
- (9) Volume of phosphogypsum generated: 8,000,000 tons/year 21,900 tons/day
- (10) Date site ready to receive phosphogypsum: Q1 2027 Estimated life of facility 12.0 years
- (11) Estimated cost of construction, Total \$ 290 M Estimated cost of closing \$ 139MM
- (12) Anticipated construction starting and completion dates form Q1 2024 to Q2 2030

PART III - PHOPHOGYPSUM STACK CONSTRUCTION/OPERATION PERMIT GENERAL REQUIREMENTS

Permit application and supporting information shall include the following (62-673.350, F.A.C.)

	Completeness Check	Location
(1) Four copies, at a minimum, of the completed application form, engineering plans, all supporting data, and reports [62-673.320(2)]	<input checked="" type="checkbox"/>	<u>This submittal</u>
(2) A letter of transmittal to the Department [62-673.320(3)(a)]	<input checked="" type="checkbox"/>	<u>This submittal</u>
(3) A table of contents listing the main sections of the application [62-673.320(3)(b)]	<input checked="" type="checkbox"/>	<u>Eng Report</u>
(4) The permit fee specified in Rule 62-4.05, F.A.C. in check or money order payable to the Department [62-673.320(3)(c)]	<input checked="" type="checkbox"/>	<u>Attached</u>
(5) Engineer and geologist seal [62-673.320(3)(d)]	<input checked="" type="checkbox"/>	<u>This submittal</u>
(6) Demonstration of ownership or control of property [62-673.620(3)(m)]	<input checked="" type="checkbox"/>	<u>Section 3.5.2</u>
(7) Proof of publication of notice of application for the proposed activity in a newspaper of general circulation [62-673.320(4)]	<input type="checkbox"/>	<u>At a later date</u>

PART IV - PHOSPHOGYPSUM STACK SITE AND CONSTRUCTION INFORMATION

The following information items must be included in the application or an explanation given if they are not applicable. NOTE: All maps, plan sheets, drawings, isometrics, cross-sections, or aerial photographs shall be legible; be signed and sealed by the registered professional engineer responsible for their preparation; be of appropriate scale to show clearly all required details; be numbered, referenced to narrative, titled, have a legend of symbols used, contain horizontal and vertical scales (where applicable), and specify drafting or origination dates; and use uniform scales as much as possible, contain a north arrow, and use NGVD for all elevations.

	Completeness Check	Location
(1) Hydrogeological investigation [62-673.320(3)(j)]	<input checked="" type="checkbox"/>	<u>Section 3.5.5</u>
(2) Geotechnical investigation [62-673.320(3)(k)]	<input checked="" type="checkbox"/>	<u>Section 3.5.5</u>
(3) A map or aerial photograph of the area, no more than 1 year old, showing land use and zoning within 1 mile of the facility with all significant features labeled [62-673.320(3)(g)]	<input checked="" type="checkbox"/>	<u>Section 3.5.3</u>
(4) Plot plan on a scale not greater than 200 feet to the inch showing the following items (a) through (d)[62-673.320(3)(h)]	<input checked="" type="checkbox"/>	<u>Section 3.5.4</u>

	Completeness Check	Location
(a) Dimensions of phosphogypsum stack system	<input checked="" type="checkbox"/>	<u>Section 3.5.4</u>
(b) Original elevations	<input checked="" type="checkbox"/>	<u>Section 3.5.4</u>
(c) Final contours	<input checked="" type="checkbox"/>	<u>Section 3.5.4</u>
(d) Location of soil borings	<input checked="" type="checkbox"/>	<u>Section 3.5.4</u>
(5) Topographic maps (which may be combined with the plot plan) on a scale not greater than 200 feet to the inch showing the following items (a) through (f) [62-673.320(3)(i)]	<input checked="" type="checkbox"/>	<u>Section 3.5.4</u>
(a) Five-foot contour intervals	<input checked="" type="checkbox"/>	<u>Section 3.5.4</u>
(b) Proposed area of phosphogypsum disposal	<input checked="" type="checkbox"/>	<u>Section 3.5.4</u>
(c) Cooling ponds, surge ponds, and perimeter drainage conveyances	<input checked="" type="checkbox"/>	<u>Section 3.5.4</u>
(d) Access roads	<input checked="" type="checkbox"/>	<u>Section 3.5.4</u>
(e) Grades required for proper drainage	<input checked="" type="checkbox"/>	<u>Section 3.5.4</u>
(f) Typical cross sections of the phosphogypsum stack system including starter dikes, dikes, ditches, cooling, surge ponds, drainage conveyances, and drainage controls.	<input checked="" type="checkbox"/>	<u>Section 3.5.4</u>
(6) Location requirements [62-673.340(2)]	<input checked="" type="checkbox"/>	<u>Section 3.5.1</u>
(a) Set back distance from property boundaries	<input checked="" type="checkbox"/>	<u>Section 3.5.1.1</u>
(b) 100-year flood plain	<input checked="" type="checkbox"/>	<u>Section 3.5.1.2</u>
(c) 500 feet from a shallow supply well	<input checked="" type="checkbox"/>	<u>Section 3.5.1.4</u>
(d) 200 feet from a natural or artificial surface water of the state	<input checked="" type="checkbox"/>	<u>Section 3.5.1.3</u>
(7) Evidence of an approved laboratory for ground water monitoring [62-673.320(3)(l)]	<input checked="" type="checkbox"/>	<u>Section 3.5.7</u>

PART V - LINER AND LEACHATE CONTROL SYSTEM PERFORMANCE AND DESIGN INFORMATION

	Completeness Check	Location
(1) Liner performance and design [62-673.400(2)(a), (b), & (d)]	<input checked="" type="checkbox"/>	<u>Section 3.5.9</u>
(a) Material type (soil, synthetic, other)	<input checked="" type="checkbox"/>	<u>Section 3.5.9</u>
(b) Adequate base support	<input checked="" type="checkbox"/>	<u>Section 3.5.9</u>
(c) Planned installation adequate to cover all surrounding earth	<input checked="" type="checkbox"/>	<u>Section 3.5.9</u>
(d) Equivalency to design standards	<input checked="" type="checkbox"/>	<u>Section 3.5.9</u>
(2) Liner quality control plan [62-673.400(2)(c)]	<input checked="" type="checkbox"/>	<u>Section 3.5.11</u>
(a) Specifications	<input checked="" type="checkbox"/>	<u>Section 3.5.11</u>
(b) Construction/installation methods	<input checked="" type="checkbox"/>	<u>Section 3.5.11</u>
(c) Sampling and testing	<input checked="" type="checkbox"/>	<u>Section 3.5.11</u>

	Completeness Check	Location
(d) Manufacturer's specifications and recommendations	<input checked="" type="checkbox"/>	Section 3.5.11
(3) Leachate control system standards [62-673.400(2)(e)]	<input checked="" type="checkbox"/>	Section 3.5.9
(a) Perimeter underdrain to stabilize slopes	<input checked="" type="checkbox"/>	Section 3.5.9
(b) Perimeter drainage conveyances within liner system	<input checked="" type="checkbox"/>	Section 3.5.9
(4) Operation requirements [62-673.500]	<input checked="" type="checkbox"/>	Section 3.5.6
(a) Operation plan	<input checked="" type="checkbox"/>	Section 3.5.6
(b) Ground water monitoring	<input checked="" type="checkbox"/>	Section 3.5.7
(c) Collection, control, recycling and treatment of surface runoff	<input checked="" type="checkbox"/>	3.5.6 and 3.5.9
(d) Collection, containment and treatment of leachate	<input checked="" type="checkbox"/>	Section 3.5.9
(5) Closure Plan [62-673.600]	<input checked="" type="checkbox"/>	Section 3.5.12
(a) Conceptual design	<input checked="" type="checkbox"/>	Section 3.5.12
(b) Closure cost estimates	<input checked="" type="checkbox"/>	Section 3.5.12
(c) Closure schedule	<input checked="" type="checkbox"/>	Section 3.5.12
(6) Financial responsibility [62-673.640]	<input checked="" type="checkbox"/>	Section 3.5.12

PART VI - CERTIFICATION BY APPLICANT AND ENGINEER

(1) Applicant

The undersigned applicant or authorized representative *of Mosaic Fertilizer, LLC is aware that statements made in this form and the attached information are an application for a permit from the Florida Department of Environmental Protection and certifies that the information in this application is true, correct and complete to the best of his knowledge and belief. Furthermore, the undersigned agrees to comply with the provision of Chapter 403, Florida Statutes, and all rules of the Department. It is understood that the permit is not transferable, and the Department will be notified before the sale or legal transfer of the permitted facility.

*Attach letter of authorization if representative is not the owner or a corporate officer.



Signature of Applicant or Authorized Representative

NEVIN MAGA GENERAL MANAGER

Name and Title

Date Signed: FEB 7 2024

- (2) Professional Engineer, Registered in Florida or Public Officer as required in Sections 403.707 and 403.7075, Florida Statutes

This is to certify that the engineering features of this facility have been designed/examined by me and found to conform to engineering principles applicable to such facilities. In my professional judgment, this facility, when properly maintained and operated, will substantially comply with all applicable statutes of the State of Florida and rules of the Department. It is agreed that the undersigned will provide the applicant with a set of instructions of proper maintenance and operation of this facility.



Signature

Mohamad Al-hawaree, P.E., Senior Consultant

Name and Title (Please type)

58537

Florida Registration Number

8008 S Orange Avenue

Mailing Address

Orlando, FL 32809

City, State, Zip Code

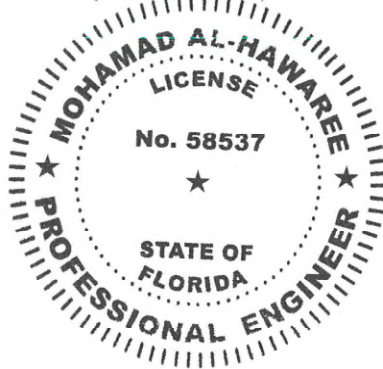
407-855-3860

Telephone Number (including area code)

02/15/2024

Date Signed

(Please affix seal)



**CERTIFICATE OF OFFICER
OF MOSAIC FERTILIZER, LLC
AS TO AUTHORIZATION**

The undersigned, Kelly J. Strong, does hereby certify that he is the duly elected Vice President – Operations, Mining North America of Mosaic Fertilizer, LLC, a Delaware limited liability company (the “Company”) and further certifies as follows:

1. Nevin G. Maga, in his capacity as General Manager – New Wales for the Company, is authorized to execute and submit all routine environmental reports, permit applications and follow-up responses, where the signature of an officer is not otherwise mandated by law, statute, or regulation.
2. The signature appearing opposite Mr. Maga’s name is a true and correct specimen of his signature:

NAME:

TITLE:

SIGNATURE:

Nevin G. Maga

General Manager –
New Wales

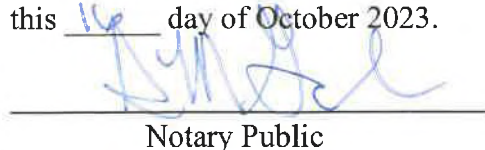


In witness whereof, the undersigned has executed this document effective this 16 day of October, 2023.



Kelly J. Strong
Vice President – Operations, Mining North
America

Subscribed and sworn to before me
this 16 day of October 2023.



Notary Public

Table of Contents

Section	Title	Page
1	OVERVIEW OF NEW WALES GYPSUM STACK SYSTEM AND PLAN OF STUDY FOR FDEP PERMIT APPLICATION	1-1
1.1	Facility History	1-1
1.1.1	North Gypsum Stack	1-2
1.1.2	South Gypsum Stack	1-3
1.1.3	Phase III Extension	1-7
1.1.4	Emergency Diversion Impoundment	1-8
1.2	Gypsum Stack System	1-9
1.2.1	Cooling Pond System	1-9
1.2.2	South Gypsum Stack	1-11
1.2.3	Phase III East Extension	1-12
1.2.4	Phase III West Extension	1-13
1.2.5	Lined Auxiliary Holding Ponds	1-13
1.2.6	Below-Grade Auxiliary Holding Ponds	1-14
1.3	Closed North Gypsum Stack	1-14
1.4	Performance of South Gypsum Stack and Phase III East Extension	1-15
1.4.1	Groundwater Monitoring	1-17
1.4.1.1	Surficial Aquifer System	1-17
1.4.1.2	Intermediate Aquifer System	1-19
1.4.1.3	Floridan Aquifer System	1-20
1.4.2	Passive Seismic Monitoring	1-25
1.4.3	Foundation Drainage Layer Piezometer Monitoring	1-26
1.4.4	Stabilized Paleo-Sink Feature Piezometer Monitoring	1-28
1.4.5	Findings of Performance Monitoring	1-28
1.5	Plan of Study for Preparation of FDEP Phase IV Permit Application	1-28
2	FACILITY AND AREA INFORMATION	2-1
2.1	Facility Location	2-1
2.2	Site Conditions and Topography	2-2
2.3	Zoning and Land Use Designations	2-3

Table of Contents

<u>Section</u>	<u>Title</u>	<u>Page</u>
2	FACILITY AND AREA INFORMATION (Cont'd)	
2.4	Land Use Classifications	2-3
2.5	Flood Hazard Areas	2-5
2.6	Property Ownership	2-5
3	DESCRIPTION OF PHASE IV GYPSUM STACK EXTENSION	3-1
3.1	Overview of Extension Area Layout	3-1
3.1.1	Extension Area Layout	3-1
3.1.2	Schedule	3-3
3.2	Components and Key Design Features	3-3
3.2.1	Site Preparation	3-3
3.2.2	Inverted Composite Liner System	3-4
3.2.3	Underdrains Atop Inverted Composite Liner System	3-5
3.2.4	Containment Dike and Process Water Ditch Systems	3-5
3.2.5	Connections to Phase III Extension	3-7
3.2.6	Abandonment of Water Supply Wells	3-7
3.2.6.1	Abandonment of Inactive Water Supply Wells	3-7
3.2.6.2	Abandonment of Active Water Supply Wells	3-9
3.2.7	Abandonment of Former Sealing Water Wells	3-9
3.2.7.1	Abandoned Wells	3-9
3.2.7.2	Wells Not Yet Abandoned	3-9
3.2.8	Micro-Seismic Foundation Monitoring System	3-15
3.2.9	Foundation Drainage System	3-16
3.2.9.1	Drainage Layer	3-16
3.2.9.2	Soil-Bentonite Cut-Off Wall	3-16
3.2.9.3	Foundation Drains	3-17
3.2.9.4	Perimeter Drain	3-17
3.2.9.5	Pump Stations	3-18
3.2.10	Foundation Piezometer Monitoring System	3-19
3.2.11	Modifications to Existing Underdrains Outlets	3-19
3.2.12	Stormwater Drainage Ditch System	3-20
3.2.13	Wetlands Recharge Ditch	3-22
3.2.14	Hydraulic Structures	3-22
3.2.15	Gypsum Slurry Conveyance System	3-23
3.2.16	Other Modifications to Existing Phase III Extension	3-23

Table of Contents

Section	Title	Page
3	DESCRIPTION OF PHASE IV GYPSUM STACK EXTENSION (Cont'd)	
3.3	Stack Height, Storage Capacity and Life	3-24
3.4	Water Balance	3-25
3.5	Application Compliance with Chapter 62-673 Phosphogypsum Management	3-26
3.5.1	Location Requirements	3-27
3.5.1.1	Set-Back from Property Boundary	3-27
3.5.1.2	100-Year Flood Hazard Areas	3-27
3.5.1.3	Distance from Waters of the State	3-27
3.5.1.4	Distance from Drinking Water Wells	3-28
3.5.2	Property Ownership	3-28
3.5.3	Land Use and Zoning Maps	3-28
3.5.4	Plot Plan and Topographic Maps	3-28
3.5.5	Hydrogeological and Geotechnical Investigations	3-29
3.5.6	Operation and ISSM Plans	3-29
3.5.7	Groundwater Monitoring	3-29
3.5.8	Surface Water Management	3-29
3.5.9	Liner and Leachate Control and Conveyance Systems	3-30
3.5.10	Process Water Containment and Conveyance Systems	3-30
3.5.11	Construction Quality Assurance Plan	3-30
3.5.12	General Closure Plan and Financial Responsibility	3-30
3.6	Application Compliance with Chapter 62-672 for Phosphogypsum Stack System Impoundments	3-30
3.6.1	Perimeter Earthen Dike	3-31
3.6.2	Process Water Conveyance	3-31
3.6.3	Gypsum Stack Stability	3-32
3.6.4	Starter Dike Height	3-32
3.6.5	Operation and Contingency Plans	3-32
4	HYDROGEOLOGIC SETTING AND EVALUATION OF POTENTIAL FOR SINKHOLE DEVELOPMENT	4-1
4.1	Lithostratigraphic and Hydrostratigraphic Nomenclature	4-1

Table of Contents

Section	Title	Page
4	HYDROGEOLOGIC SETTING AND EVALUATION OF POTENTIAL FOR SINKHOLE DEVELOPMENT (Cont'd)	4-1
4.2	Stratigraphy	4-3
4.2.1	Oldsmar Formation	4-5
4.2.2	Avon Park Formation	4-5
4.2.3	Ocala Limestone	4-6
4.2.4	Suwannee Limestone	4-7
4.2.5	Arcadia Formation	4-8
4.2.5.1	Nocatee Member	4-9
4.2.5.2	Tampa Member	4-11
4.2.5.3	Undifferentiated Arcadia Formation	4-12
4.2.6	Peace River Formation	4-18
4.2.7	Undifferentiated Surficial Soils	4-19
4.2.8	Altered Land	4-20
4.3	Hydrogeology	4-20
4.3.1	Floridan Aquifer System	4-22
4.3.1.1	Transmissivity	4-22
4.3.1.2	Groundwater Flow Direction and Hydraulic Gradient	4-23
4.3.1.3	Piezometer Water Elevation	4-23
4.3.1.4	Groundwater Quality in Upper Permeable Zone	4-24
4.3.1.5	Groundwater Quality in Lower Permeable Zone	4-26
4.3.2	Intermediate Aquifer System	4-26
4.3.2.1	Upper Confining Unit	4-26
4.3.2.2	Major Producing Zone	4-30
4.3.2.3	Lower Confining Unit	4-32
4.3.3	Surficial Aquifer System	4-32
4.3.4	Aquifer Vulnerability Assessment	4-36
4.4	Regional Structural Geology	4-41
4.5	Potential for Sinkhole Development	4-42
4.5.1	Sinkhole Frequency Analysis	4-42
4.5.2	Photolinear Analysis	4-44

Table of Contents

Section	Title	Page
4	HYDROGEOLOGIC SETTING AND EVALUATION OF POTENTIAL FOR SINKHOLE DEVELOPMENT (Cont'd)	
4.5.3	Evaluation of Topographic Depressions	4-47
4.5.3.1	Topographic Depressions Investigated During Mining	4-48
4.5.3.2	Topographic Depressions Investigated Subsequent to Mining	4-48
4.5.3.2.1	Topographic Depression III-1	4-49
4.5.3.2.2	Topographic Depression IV-1	4-50
4.5.3.2.3	Topographic Depression IV-2	4-50
4.5.3.2.4	Topographic Depression IV-3	4-51
4.5.3.2.5	Topographic Depression IV-4	4-52
4.5.3.3	Summary of Findings	4-53
4.5.4	Evaluation of Photolinear Intersections	4-54
4.6	Geophysical Investigations	4-55
4.6.1	Microgravity Survey at Selected Locations	4-55
4.6.2	Microgravity Survey in the Phase IV Extension Footprint	4-56
4.6.2.1	Summary of Findings from Microgravity Survey Borings	4-58
4.6.3	Seismic Reflection Survey	4-60
4.6.3.1	Seismic Reflection Feature DT-IV-13	4-61
4.6.3.2	Seismic Reflection Feature DT-IV-12	4-63
4.6.3.3	Seismic Reflection Feature DT-IV-7	4-65
4.6.3.4	Seismic Reflection Feature DT-IV-11	4-67
4.6.3.5	Seismic Reflection Feature DT-IV-4	4-68
4.6.3.6	Seismic Reflection Feature DT-IV-8	4-70
4.6.3.7	Seismic Reflection Feature DT-IV-5	4-72
4.6.3.8	Seismic Reflection Feature DT-IV-10	4-73
4.6.3.9	Other Seismic Reflection Features	4-75
4.7	Summary of Findings	4-76
4.7.1	Topographic Depressions	4-76
4.7.2	Photolinear Intersections	4-76
4.7.3	Low Residual Gravity Features	4-77
4.7.4	Seismic Reflection Features	4-77

Table of Contents

<u>Section</u>	<u>Title</u>	<u>Page</u>
5	FIELD EXPLORATION AND STRATIGRAPHY IN MINED AND UNMINED LAND	5-1
5.1	Sampling and Test Methods	5-2
5.1.1	Standard Penetration Test Borings	5-2
5.1.2	Undisturbed Sampling	5-4
5.1.3	Cone Penetration Test Soundings	5-4
5.1.4	Piezometer Installation	5-5
5.2	Stratigraphy in Unmined Land	5-5
5.2.1	Fill Material	5-6
5.2.2	Sand Tailings	5-6
5.2.3	Undifferentiated Surficial Soils	5-6
5.2.4	Bone Valley Member	5-7
5.2.5	Undifferentiated Peace River Formation	5-8
5.2.6	Undifferentiated Arcadia Formation	5-9
5.3	Stratigraphy in Mined Land	5-10
5.3.1	Cast Overburden	5-10
5.3.2	Sand Tailings	5-11
5.3.3	Remnant Bone Valley Member	5-11
5.3.4	Undifferentiated Peace River Formation	5-11
5.3.5	Undifferentiated Arcadia Formation	5-12
5.4	Soil-Bentonite Cut-Off Wall	5-13
5.5	Soft Clay Exploration	5-13
5.6	Groundwater Levels	5-14
6	LABORATORY TESTING AND ENGINEERING PROPERTIES OF SOILS AND PHOSPHOGYPSUM	6-1
6.1	Laboratory Testing Methods and Nomenclature	6-1
6.1.1	Soil Description and Classification	6-1
6.1.2	Water Content and <i>In-Situ</i> Total Unit Weight	6-2
6.1.3	Atterberg Limits	6-2
6.1.4	Particle-Size Distribution	6-2
6.1.5	Organic Content	6-2
6.1.6	Carbonate Content	6-3

Table of Contents

<u>Section</u>	<u>Title</u>	<u>Page</u>
6	LABORATORY TESTING AND ENGINEERING PROPERTIES OF SOILS AND PHOSPHOGYPSUM (Cont'd)	
	6.1.7 Compaction	6-3
	6.1.8 Shear Strength	6-3
	6.1.9 HDPE Liner Interface Friction	6-3
	6.1.10 Hydraulic Conductivity	6-3
	6.1.11 Consolidation Tests	6-4
6.2	<i>In-Situ</i> Natural Ground Soils	6-4
	6.2.1 Water Content and <i>In-Situ</i> Total Unit Weight	6-4
	6.2.2 Particle-Size Distribution	6-7
	6.2.3 Atterberg Limits	6-9
	6.2.4 Carbonate Content	6-9
	6.2.5 One-Dimensional Consolidation Test	6-10
	6.2.6 Shear Strength	6-11
6.3	Cast Overburden Soils	6-11
	6.3.1 Water Content and <i>In-Situ</i> Total Unit Weight	6-11
	6.3.2 Particle-Size Distribution	6-13
	6.3.3 Atterberg Limits	6-14
	6.3.4 Constrained Modulus	6-14
	6.3.5 Shear Strength	6-15
6.4	Sand Tailings	6-15
	6.4.1 Water Content	6-15
	6.4.2 Particle-Size Distribution	6-15
	6.4.3 Minimum and Maximum Dry Densities	6-16
	6.4.4 HDPE Liner Interface Friction	6-16
6.5	Phosphatic Clays	6-16
	6.5.1 Water Content and <i>In-Situ</i> Total Unit Weight	6-16
	6.5.2 Fines Content	6-17
	6.5.3 Atterberg Limits	6-17
	6.5.4 One-Dimensional Consolidation Test	6-17
6.6	Phosphogypsum	6-18
	6.6.1 Particle-Size Distribution	6-18
	6.6.2 Compaction	6-18

Table of Contents

<u>Section</u>	<u>Title</u>	<u>Page</u>
6	LABORATORY TESTING AND ENGINEERING PROPERTIES OF SOILS AND PHOSPHOGYPSUM (Cont'd)	
	6.6.3 Hydraulic Conductivity	6-18
	6.6.3.1 Compacted Phosphogypsum	6-18
	6.6.3.2 <i>In-Situ</i> Phosphogypsum	6-18
	6.6.4 HDPE Liner Interface Friction	6-19
	6.6.5 Shear Strength	6-19
7	DESIGN CRITERIA AND CONSTRUCTION PROVISIONS	7-1
7.1	Perimeter Earthen Dike	7-1
	7.1.1 Design Features	7-1
	7.1.2 Site Preparation	7-2
	7.1.3 Construction Materials, Methods and Documentation	7-2
	7.1.4 Process Water Conveyance	7-3
	7.1.4.1 Seepage Collection Ditch	7-4
	7.1.4.2 Decant Water/Runoff Collection Ditch	7-5
	7.1.4.3 Flume Structures	7-7
	7.1.4.4 Hydraulic Modeling	7-7
	7.1.5 Stability Analysis	7-14
7.2	Gypsum Dike	7-18
7.3	Inverted Composite Liner System	7-19
	7.3.1 Base Preparation	7-20
	7.3.2 Settlement Induced Strain in HDPE Liner	7-20
	7.3.3 Connection to Phase III Stack Extension Inverted Composite Liner	7-22
7.4	Foundation Drainage System	7-22
	7.4.1 Foundation Piezometer Monitoring System	7-23
7.5	Gypsum Stack Seepage and Stability Analyses	7-24
	7.5.1 Underdrain System	7-25
	7.5.2 Seepage Analyses	7-25
	7.5.3 Stability Analyses	7-27

Table of Contents

<u>Section</u>	<u>Title</u>	<u>Page</u>
8	OPERATION PLAN AND GROUNDWATER AND SURFACE WATER MONITORING PLANS	8-1
8.1	Operation Plan	8-1
8.1.1	Gypsum Slurry Transport	8-2
8.1.2	Gypsum Stack Operation	8-3
8.1.3	Decanting Procedures	8-4
8.1.4	Pumps, Spillways and Staff Gauges	8-5
8.1.5	Gypsum Stack Height and Exterior Slopes	8-5
8.1.6	Emergency Measures	8-5
8.1.7	Water Management Plan	8-6
8.1.8	Water Balance	8-6
8.1.9	Inspection and Maintenance	8-6
8.2	Groundwater Monitoring Plan	8-7
8.2.1	Zone of Discharge	8-7
8.2.2	Existing Groundwater Monitoring Plan	8-7
8.2.3	Proposed Groundwater Monitoring Plan	8-9
8.2.3.1	Monitor Well Abandonment	8-9
8.2.3.2	Replacement and New Monitor Wells	8-10
8.2.3.3	Recovery Well	8-11
8.2.4	Surficial and Intermediate Aquifer System Monitor Well Installation	8-11
8.2.5	Floridan Aquifer System Monitor Well Installation	8-12
8.2.6	Groundwater Sampling and Analyses	8-13
8.2.7	Supplemental Groundwater Monitoring	8-13
8.3	Surface Water Monitoring Plan	8-13
8.3.1	Outfall D-006	8-14
8.3.2	Background and Downstream In-stream Monitoring Stations	8-15
8.3.3	Internal Outfall I-006	8-16
8.3.4	Supplemental Surface Water Monitoring Station	8-16

Table of Contents

<u>Section</u>	<u>Title</u>	<u>Page</u>
9	GENERAL CLOSURE PLAN AND CLOSURE COST ESTIMATE	9-1
9.1	Closure Design Features	9-1
9.1.1	Top Gradient Final Cover	9-2
9.1.2	Side Slope Final Cover and Drainage Swales	9-2
9.1.3	Side Slope and Toe Drains	9-3
9.1.4	Seepage Collection Ditch Closure	9-4
9.1.5	Surface Water Management	9-4
9.1.6	Seepage/Leachate Control	9-5
9.2	Closure Schedule	9-5
9.3	Closure Construction Cost Estimate	9-5
9.3.1	Gypsum Excavation and Fill, Dewatering, Fine Grading and Compaction	9-6
9.3.2	HDPE Geomembrane	9-6
9.3.3	Protective Soil Cover	9-6
9.3.4	Gypsum Side Slope Amendment and Grassing	9-7
9.3.5	Drain and Header Pipes	9-7
9.3.6	Soil Cover Grassing by Seeding and Sodding	9-7
9.3.7	Surface Water Control	9-7
9.3.8	Design, Construction Management and Quality Assurance/Control	9-7
9.3.9	Contractor Mobilization/Demobilization, Safety and Surveying	9-7
9.4	Long-Term Care Costs	9-8
9.4.1	Caretaker/Operator/Coordinator	9-8
9.4.2	Routine Inspections	9-8
9.4.3	Fence Maintenance	9-8
9.4.4	Groundwater Monitoring	9-8
9.4.5	Surface Water Monitoring	9-8
9.4.6	Mowing	9-8
9.4.7	Land Surface Care and Repairs	9-9
9.4.8	Pump Operation and Maintenance	9-9
9.5	Comparison with Terminal Closure Costs	9-9

Table of Contents

<u>Section</u>	<u>Title</u>	<u>Page</u>
10	TECHNICAL SPECIFICATIONS AND CONSTRUCTION QUALITY ASSURANCE PLAN	10-1
10.1	Site Preparation	10-1
10.1.1	Referenced Standards	10-2
10.1.2	Layout of the Work	10-2
10.1.3	Site Access	10-2
10.1.4	Dewatering and Surface Water Control	10-2
10.1.4.1	Temporary Dewatering Ditches	10-3
10.1.5	Clearing, Grubbing and Stripping	10-3
10.1.6	Soft Sediment Removal	10-4
10.1.6.1	Removal by Desiccation and Excavation	10-4
10.1.6.2	Removal by Mud-Waving and Excavation	10-4
10.1.7	Quality Assurance Monitoring	10-5
10.1.8	Submittals	10-5
10.2	Site Grading and Earthwork	10-6
10.2.1	Referenced Standards	10-6
10.2.2	Source of Soil Borrow	10-7
10.2.3	Material Requirements	10-7
10.2.3.1	General Soil Fill	10-7
10.2.3.2	Select Soil Fill	10-7
10.2.3.3	Sand Tailings	10-8
10.2.3.4	Soil Pipe Bedding	10-8
10.2.3.5	Water	10-8
10.2.4	Fill Placement and Compaction	10-8
10.2.4.1	Site Grading	10-8
10.2.4.2	Earthen Dike Construction	10-9
10.2.4.3	Sand Tailings Drainage Layer	10-10
10.2.4.4	Soil Pipe Bedding	10-10
10.2.5	Maintenance	10-11
10.2.6	Dust Control	10-11
10.2.7	Grading Tolerances	10-11
10.2.7.1	Vertical Tolerances	10-11
10.2.7.2	Horizontal Tolerances	10-12
10.2.8	Quality Assurance Monitoring and Testing	10-12

Table of Contents

Section	Title	Page
10	TECHNICAL SPECIFICATIONS AND CONSTRUCTION QUALITY ASSURANCE PLAN (Cont'd)	
10.3	HDPE Liner Materials	10-13
10.3.1	Referenced Standards	10-14
10.3.2	Material Requirements	10-15
10.3.2.1	Base Resin	10-16
10.3.2.2	Welding Rod	10-17
10.3.2.3	Physical Appearance of Liner Sheets	10-17
10.3.2.4	Smooth Liner Physical Properties	10-17
10.3.2.5	Textured Liner Physical Properties	10-19
10.3.2.6	Frictional Characteristics	10-20
10.3.3	Manufacturing and Factory Quality Control Inspection and Testing	10-21
10.3.3.1	Minimum Sheet Dimensions	10-21
10.3.3.2	Marking and Packaging	10-22
10.3.3.3	Factory Inspection and Spark Testing	10-22
10.3.3.4	Factory Quality Control Testing	10-22
10.3.3.4.1	HDPE Resin	10-23
10.3.3.4.2	Liner Rolls	10-23
10.3.4	Quality Assurance Testing	10-25
10.3.4.1	Sampling by Liner Manufacturer	10-25
10.3.4.2	Quality Assurance Testing by Engineer	10-25
10.3.4.3	Sampling by Liner Contractor	10-26
10.3.5	Material Warranty	10-26
10.3.6	Submittals	10-26
10.4	HDPE Liner Installation	10-28
10.4.1	Referenced Standards	10-28
10.4.2	Surface Water Control and Base Maintenance	10-28
10.4.3	Liner Handling and Installation	10-29
10.4.3.1	On-Site Storage	10-29
10.4.3.2	Handling and Panel Placement	10-29
10.4.3.3	Field Seams	10-30
10.4.3.3.1	Field Seam Strength	10-32
10.4.3.3.2	Pass/Fail Criteria	10-33
10.4.3.4	Anchor Trenches	10-34
10.4.3.5	Temporary Ballast Loading	10-34
10.4.3.6	Pipe Vents	10-35

Table of Contents

Section	Title	Page
10	TECHNICAL SPECIFICATIONS AND CONSTRUCTION QUALITY ASSURANCE PLAN (Cont'd)	
	10.4.3.7 Repairs	10-35
	10.4.3.8 Liner Protection	10-36
	10.4.3.9 Fuel and Oil Spill Clean-up	10-36
10.4.4	Inspection and Field Testing by Contractor	10-36
	10.4.4.1 Initial Qualifying Trial Welds	10-36
	10.4.4.2 Daily Qualifying Test Welds	10-37
	10.4.4.3 Non-Destructive Testing of Welds	10-37
	10.4.4.4 Sampling and Destructive Testing	10-39
	10.4.4.5 Visual Inspection	10-39
	10.4.4.6 Quality Assurance Forms	10-39
	10.4.4.7 Certification	10-40
10.4.5	Quality Assurance Monitoring and Testing	10-40
	10.4.5.1 Base Maintenance and Repair During Liner Installation	10-40
	10.4.5.2 Liner Installation	10-41
	10.4.5.3 Destructive Testing	10-41
10.4.6	Insurance	10-41
10.4.7	Warranty	10-42
10.4.8	As-Built Drawings	10-42
10.4.9	Submittals	10-42
10.5	HDPE Pipe and Fittings	10-43
10.5.1	Referenced Standards	10-43
10.5.2	Material Requirements	10-44
	10.5.2.1 Base Resin	10-44
	10.5.2.2 Physical Appearance	10-45
	10.5.2.3 Physical Properties	10-45
	10.5.2.4 Pipe Sizes	10-46
	10.5.2.5 Slotted Pipe	10-46
	10.5.2.6 Fabricated Fittings	10-46
	10.5.2.7 Molded Fittings	10-47
	10.5.2.8 Electrofusion Fitting	10-47
	10.5.2.9 Cold Bends	10-47
	10.5.2.10 HDPE Plate for Liner Penetrations	10-47
	10.5.2.11 Approved Manufacturers	10-47
	10.5.2.12 Marking and Packaging	10-48

Table of Contents

<u>Section</u>	<u>Title</u>	<u>Page</u>
10	TECHNICAL SPECIFICATIONS AND CONSTRUCTION QUALITY ASSURANCE PLAN (Cont'd)	
	10.5.3 Storage and Handling	10-48
	10.5.4 Joint Requirements	10-48
	10.5.5 Laying and Installation	10-49
	10.5.5.1 HDPE Pipe and Fittings	10-49
	10.5.5.2 Pipe Vents	10-50
	10.5.5.3 Pipe Seepshields	10-50
	10.5.5.4 Liner Pipe Penetrations	10-50
	10.5.5.5 HDPE Structures	10-50
	10.5.5.6 Protection and Repairs	10-50
	10.5.6 Quality Assurance Monitoring and Testing	10-51
	10.5.7 Submittals	10-52
10.6	Aggregates	10-52
	10.6.1 Referenced Standards	10-52
	10.6.2 Material Requirements	10-53
	10.6.2.1 Silica Gravel	10-53
	10.6.2.2 Coarse Sand	10-54
	10.6.2.3 Fine Sand	10-55
	10.6.3 Placement and Compaction	10-55
	10.6.4 Quality Assurance Monitoring and Testing	10-56
	10.6.5 Submittals	10-57
10.7	Nonwoven Geotextile	10-57
	10.7.1 Referenced Standards	10-57
	10.7.2 Materials Requirements	10-58
	10.7.3 Factory Quality Control Testing and Inspection	10-59
	10.7.3.1 Factory Testing	10-59
	10.7.3.2 Factory Inspection	10-59
	10.7.3.3 Marking and Packaging	10-60
	10.7.4 Storage, Handling and Installation	10-60
	10.7.4.1 Storage and Handling	10-60
	10.7.4.2 Laying and Installation	10-60
	10.7.4.3 Field Seams	10-61
	10.7.4.4 Repairs	10-61

Table of Contents

<u>Section</u>	<u>Title</u>	<u>Page</u>
10	TECHNICAL SPECIFICATIONS AND CONSTRUCTION QUALITY ASSURANCE PLAN (Cont'd)	
	10.7.5 Sampling and Inspection by Contractor	10-61
	10.7.5.1 Sampling	10-61
	10.7.5.2 Visual Inspection	10-61
	10.7.6 Quality Assurance Monitoring and Testing	10-62
	10.7.7 Submittals	10-62
10.8	HDPE Geonet-Geotextile Composite	10-63
	10.8.1 Referenced Standards	10-63
	10.8.2 Material Requirements	10-64
	10.8.2.1 HDPE Geonet	10-65
	10.8.2.1.1 HDPE Resin	10-65
	10.8.2.1.2 Physical Appearance	10-65
	10.8.2.1.3 Physical Properties	10-65
	10.8.2.2 Geotextile	10-66
	10.8.2.3 Geonet-Geotextile Composite	10-66
	10.8.3 Factory Quality Control Testing and Inspection	10-67
	10.8.3.1 Factory Testing	10-67
	10.8.3.2 Factory Inspection	10-69
	10.8.3.3 Marking and Packaging	10-69
	10.8.4 Handling and Installation	10-69
	10.8.4.1 Storage and Handling	10-69
	10.8.4.2 Laying and Installation	10-69
	10.8.4.3 Geotextile Field Seams	10-70
	10.8.4.4 Geotextile Repairs	10-71
	10.8.4.5 Fill Placement Procedures	10-71
	10.8.5 Sampling and Inspection by Contractor	10-71
	10.8.5.1 Sampling	10-71
	10.8.5.2 Visual Inspection	10-72
	10.8.6 Quality Assurance Monitoring and Testing	10-72
	10.8.7 Submittals	10-73
10.9	Earthwork with Gypsum	10-74
	10.9.1 Referenced Standards	10-74
	10.9.2 Source of Gypsum Borrow	10-75
	10.9.3 Material Requirements	10-75
	10.9.3.1 Random Gypsum Fill	10-75

Table of Contents

<u>Section</u>	<u>Title</u>	<u>Page</u>
10	TECHNICAL SPECIFICATIONS AND CONSTRUCTION QUALITY ASSURANCE PLAN (Cont'd)	
	10.9.3.2 Select Gypsum Fill	10-75
	10.9.3.3 Inverted Composite Liner Gypsum Fill	10-75
10.9.4	Dewatering and Surface Water Control	10-75
10.9.5	Liner Protection	10-76
10.9.6	Gypsum Component of Inverted Composite Liner	10-76
	10.9.6.1 Placement and Compaction	10-76
	10.9.6.2 Compaction Criteria	10-77
	10.9.6.3 Hydraulic Conductivity	10-77
10.9.7	Gypsum Starter Dike	10-77
	10.9.7.1 Construction Procedures	10-77
	10.9.7.2 Compaction Criteria	10-78
10.9.8	Gypsum Divider Dike or Partition Dike	10-78
10.9.9	Gypsum Pipe Bedding and Fill Around Pipes	10-78
10.9.10	Gypsum Cover Above Underdrains	10-78
10.9.11	Maintenance of Completed Work	10-79
10.9.12	Quality Assurance Monitoring and Testing	10-79
10.9.13	Submittals	10-80
10.10	Underdrains and Outlets	10-80
	10.10.1 Referenced Standards	10-81
	10.10.2 Material Requirements	10-81
	10.10.3 Underdrain and Outlet Construction Procedures	10-82
	10.10.3.1 Silica Gravel Underdrain	10-82
	10.10.3.2 Outlets and Sand Pipe Bedding	10-83
	10.10.3.3 Outlet Pipes with Gypsum Bedding	10-84
10.10.4	Concrete Erosion Control Mat	10-85
	10.10.4.1 Material Requirements	10-85
	10.10.4.1.1 Fabric Forms	10-85
	10.10.4.1.2 Grout	10-85
	10.10.4.1.3 Weep Holes	10-86
	10.10.4.2 Installation Procedures	10-86
10.10.5	Quality Assurance Monitoring and Testing	10-87
10.11	Foundation Drains	10-88
	10.11.1 Referenced Standards	10-88
	10.11.2 Material Requirements	10-89

Table of Contents

<u>Section</u>	<u>Title</u>	<u>Page</u>
10	TECHNICAL SPECIFICATIONS AND CONSTRUCTION QUALITY ASSURANCE PLAN (Cont'd)	
	10.11.3 Drain and Outlet Construction Procedures	10-89
	10.11.3.1 Gravel Drain	10-89
	10.11.3.2 Outlets with Sand Pipe Bedding	10-90
	10.11.3.3 Outlet Pipes with Flowable Fill Bedding	10-91
	10.11.3.4 As-Built Survey	10-91
	10.11.4 Quality Assurance Monitoring and Testing	10-92
	10.12 Foundation Piezometers	10-93
	10.12.1 Referenced Standards	10-93
	10.12.2 Material Requirements	10-94
	10.12.3 Piezometer Installation Procedures	10-94
	10.12.3.1 Screened Zone	10-94
	10.12.3.2 Piezometer Pipe	10-95
	10.12.3.3 As-Built Survey	10-95
	10.12.4 Quality Assurance Monitoring and Testing	10-96
	10.13 Grassing and Erosion Control	10-97
	10.13.1 Referenced Standards	10-97
	10.13.2 Ground Preparation and Fertilizer Application	10-97
	10.13.3 Grassing by Seeding	10-98
	10.13.4 Mulching	10-99
	10.13.5 Fertilizer	10-99
	10.13.6 Grassing by Sodding	10-100
	10.13.7 Watering	10-101
	10.13.8 Erosion Control	10-101
	10.13.9 Maintenance	10-101
	10.13.10 Submittals	10-101
	10.14 Monitor Well Abandonment	10-102
	10.14.1 Referenced Standards	10-102
	10.14.2 Grouting	10-102
	10.14.3 Casing Removal	10-102
	10.14.4 Excavation Backfilling	10-102
	10.14.5 Quality Assurance Monitoring and Testing	10-102

Table of Contents

<u>Section</u>	<u>Title</u>	<u>Page</u>
10	TECHNICAL SPECIFICATIONS AND CONSTRUCTION QUALITY ASSURANCE PLAN (Cont'd)	
10.15	Demolition	10-103
10.15.1	Referenced Standards	10-103
10.15.2	Liner Pipe Vents	10-103
10.15.3	Monitor Well Pads and Posts	10-104
10.15.4	Concrete Inlets, End Walls and Erosion Control Mats	10-104
10.15.5	Quality Assurance Monitoring and Testing	10-104
10.16	Connection to Existing South Gypsum Stack Liner	10-105
10.16.1	Construction Procedures	10-105
10.16.2	Quality Assurance Monitoring and Testing	10-105
10.17	Ancillary Items and Materials	10-105
10.17.1	Stainless Steel Hardware	10-105
10.17.2	Flowable Fill	10-106
10.17.2.1	Referenced Standards	10-106
10.17.2.2	Materials Requirements	10-106
10.17.2.3	Construction	10-106
10.17.2.4	Quality Assurance Monitoring and Testing	10-107
10.17.2.5	Submittals	10-107
10.17.3	Erosion Protection Coarse Aggregate	10-107

LIST OF TABLES**Table Title****SECTION 1**

- 1-1 Groundwater Quality in South Gypsum Stack Surficial Aquifer System Monitor Wells
- 1-2 Groundwater Quality in Phase III Gypsum Stack Surficial Aquifer System Monitor Wells
- 1-3 Groundwater Quality in South Gypsum Stack Intermediate Aquifer System Monitor Wells
- 1-4 Groundwater Quality in Phase III Gypsum Stack Intermediate Aquifer System Monitor Wells
- 1-5 Groundwater Quality in Upper Permeable Zone of Upper Floridan Aquifer
- 1-6 Groundwater Quality in Lower Permeable Zone of Upper Floridan Aquifer
- 1-7 Groundwater Quality in Lower Permeable Zone of Upper Floridan Aquifer

SECTION 3

- 3-1 Inactive Water Supply Well Installation and Abandonment Information
- 3-2 Former Sealing Water Well Information
- 3-3 Statistics of Survey and Coordinate Transformation Error
- 3-4 Coordinates and Radius of Area Identified from Aerial Photographs to Contain Sealing Water Well MM-4
- 3-5 Statistics of Error in Center Coordinates of Area MM-4A
- 3-6 Statistics of Error in Center Coordinates of Area MM-4B
- 3-7 Storage Volume and Projected Storage Life

SECTION 4

- 4-1 Generalized Lithostratigraphic and Hydrostratigraphic Sequence
- 4-2 Elevation of Top of Avon Park Formation
- 4-3 Elevation of Top and Thickness of Ocala Limestone
- 4-4 Elevation of Top and Thickness of Suwannee Limestone
- 4-5 Elevation of Top and Thickness of Nocatee Member
- 4-6 Elevation of Top and Thickness of Tampa Member
- 4-7 Elevation of Top and Thickness of Undifferentiated Arcadia and Undifferentiated Peace River Formations
- 4-8 Monitor Wells in Vicinity of Phase IV Extension
- 4-9 Upper Floridan Aquifer System Piezometric Water Elevations
- 4-10 Groundwater Quality in Upper Permeable Zone of Upper Floridan Aquifer
- 4-11 Major Constituents in Upper Permeable Zone of Upper Floridan Aquifer
- 4-12 Trace Metal Concentrations in Upper Permeable Zone of Floridan Aquifer
- 4-13 Groundwater Quality in Lower Permeable Zone of Upper Floridan Aquifer
- 4-14 Groundwater Quality in I1-Zone of Upper Confining Unit

LIST OF TABLES**Table Title****SECTION 4 (cont'd)**

4-15	Trace Metal Concentrations in I1-Zone of Upper Confining Unit
4-16	Groundwater Quality in I2- and I3-Zones of Upper Confining Unit
4-17	Trace Metal Concentrations in I2- and I3-Zones of Upper Confining Unit
4-18	Major Producing Zone of Intermediate Aquifer System Piezometric Water Elevations
4-19	Groundwater Quality in Major Producing Zone of Intermediate Aquifer System
4-20	Trace Metal Concentrations in Major Producing Zone of Intermediate Aquifer System
4-21	Groundwater Quality in Surficial Aquifer System in Mined Land
4-22	Groundwater Quality in Surficial Aquifer System in Unmined Land
4-23	Trace Metal Concentrations in Surficial Aquifer System
4-24	FAVA Model Evidential Themes and Criteria
4-25	Comparison of DRASTIC and FAVA Model Relative Vulnerability of Aquifer Systems at the Phase IV Extension
4-26	Sinkhole Potential Classification
4-27	Topographic Depressions Along Photolinears
4-28	Summary of Findings from Investigation of Topographic Depressions
4-29	Photolinear Intersection Investigation Methodologies
4-30	Phase IV Extension Microgravity Survey Borings
4-31	Features Identified by Seismic Reflection Survey
4-32	Typical Stratigraphic Unit Gamma Ray

SECTION 6

6-1	Summary of Water Content for <i>In-Situ</i> Natural Ground Soils
6-2	Summary of Undisturbed Sample Properties of Bone Valley Member Soils
6-3	Summary of Undisturbed Sample Properties of Undifferentiated Peace River Formation Soils
6-4	Summary of Fines Content for <i>In-Situ</i> Natural Ground Soils
6-5	Summary of Atterberg Limits for <i>In-Situ</i> Natural Ground Soils
6-6	Summary of Carbonate Content for <i>In-Situ</i> Natural Ground Soils
6-7	Consolidation Tests on Undisturbed Specimens of Bone Valley Member Soils
6-8	Pre-Shear Properties of Triaxial Test Specimens from Undisturbed Samples of Bone Valley Member Soils
6-9	Undrained Triaxial Compression Tests for Undisturbed Samples of Bone Valley Member Soils
6-10	Summary of Water Contents for Cast Overburden Soils
6-11	Summary of Undisturbed Sample Properties for Cast Overburden Soils
6-12	Summary of Fines Contents for Cast Overburden Soils

LIST OF TABLES**Table Title****SECTION 6 (cont'd)**

6-13	Summary of Atterberg Limits for Cast Overburden Soils
6-14	Consolidation Tests on Reconstituted Specimens of Cast Overburden Soils
6-15	Pre-Shear Properties of Triaxial Test Specimens from Undisturbed Samples of Cast Overburden Soils
6-16	Undrained Triaxial Compression Tests for Undisturbed Samples of Cast Overburden Soils
6-17	Summary of Water Contents for Sand Tailings
6-18	Summary of Fines Contents for Sand Tailings
6-19	Interface Direct Shear Tests for 60-mil Textured HDPE Liner (Micro-Spike®) and Sand Tailings
6-20	Interface Direct Shear Tests for 60-mil Textured HDPE Liner (Solmax GSE® HD) and Sand Tailings
6-21	Summary of Water Contents and Fines Contents for Phosphatic Clays
6-22	Consolidation Tests for Undisturbed Specimens of Phosphatic Clay
6-23	Permeability Tests for Remolded Specimens of Phosphogypsum
6-24	Interface Direct Shear Tests for 60-mil Textured HDPE Liner (MicroSpike®) and Phosphogypsum
6-25	Pre-Shear Properties of Triaxial Test Specimens from Undisturbed Samples of Phosphogypsum
6-26	Undrained Triaxial Compression Tests for Undisturbed Samples of Phosphogypsum

SECTION 7

7-1	Seepage Collection Ditch Culverts
7-2	Decant Water/Runoff Collection Ditch Culverts
7-3	Cumulative Rainfall for 12-inch/24-hour Storm Event
7-4	Hydrologic Parameters
7-5	Hydraulic Parameters
7-6	Hydraulic Modeling Scenarios
7-7	Hydraulic Modeling Results for 12-inch/24-hour Storm Event
7-8	Hydraulic Modeling Results for 25-year/24-hour Storm Event
7-9	Perimeter Earthen Dike Stability Analysis Factor of Safety
7-10	Remnant Unmined Bone Valley Member Virgin Compression Ratio
7-11	Gypsum Stack Stability Analysis Factors of Safety

LIST OF TABLES**Table Title****SECTION 8**

- 8-1 Groundwater Monitor Wells
- 8-2 Monitor Well Parameters
- 8-3 Groundwater Monitor Wells to be Abandoned During Phase IV Construction
- 8-4 Replacement and Additional Groundwater Monitor Wells
- 8-5 Surface Water Monitoring Requirements at Outfall D-006
- 8-6 Surface Water Monitoring Requirements at Outfall D-006 Background and Downstream In-Stream Monitoring Stations
- 8-7 Surface Water Monitoring Requirements at Internal Outfall I-006
- 8-8 Supplemental Surface Water Monitoring Requirements at Station SW-1

SECTION 9

- 9-1 Closure Construction Cost Estimate for Combined South Gypsum Stack and Phase III and Phase IV Gypsum Stack Extension
- 9-2 CY2023 Closure Construction Unit Costs
- 9-3 Long-Term Care Cost Estimate for Combined South Gypsum Stack, Phase III Extension and Phase IV Extension

SECTION 10

- 10-1 Site Grading and Earthwork Quality Assurance Test Methods and Minimum Testing Frequencies
- 10-2 Smooth HDPE Liner Material Specifications
- 10-3 Textured HDPE Liner Material Specifications
- 10-4 Liner Interface Friction Specifications
- 10-5 Soil and Gypsum Particle-Size Distributions for Liner Interface Shear Tests
- 10-6 Minimum HDPE Liner Roll Lengths
- 10-7 HDPE Resin Factory Quality Control Test Methods and Minimum Testing Frequencies
- 10-8 HDPE Liner Factory Quality Control Test Methods and Minimum Testing Frequencies
- 10-9 HDPE Liner Quality Assurance Test Methods and Minimum Testing Frequencies
- 10-10 HDPE Liner Field Seam Peel and Shear Strength Specifications
- 10-11 Double-Wedge Fusion Weld Air Pressure Test Requirements
- 10-12 HDPE Pipe Material Specifications
- 10-13 HDPE Pipe Slot Specifications
- 10-14 HDPE Pipe Minimum Cold Bend Radii
- 10-15 Bolt Torque Requirements
- 10-16 HDPE Pipe Quality Assurance Test Methods and Minimum Testing Frequencies

LIST OF TABLES**Table Title****SECTION 10 (cont'd)**

10-17	Particle-Size Specification for Silica Gravel
10-18	Particle-Size Specification for Coarse Sand
10-19	Particle-Size Specification for Fine Sand
10-20	Aggregate Quality Assurance Test Methods and Minimum Testing Frequencies
10-21	Nonwoven Geotextile Material Specifications
10-22	Nonwoven Geotextile Factory Quality Control Test Methods and Minimum Testing Frequencies
10-23	Nonwoven Geotextile Quality Assurance Test Methods and Minimum Testing Frequencies
10-24	HDPE Geonet Material Specifications
10-25	Nonwoven Geotextile Material Specifications
10-26	Geonet-Geotextile Composite Ply Adhesion Specifications
10-27	Geonet-Geotextile Composite Transmissivity Specifications
10-28	Geonet-Geotextile Composite HDPE Geonet Component Factory Quality Control Test Methods and Minimum Testing Frequencies
10-29	Geonet-Geotextile Composite Nonwoven Geotextile Component Factory Quality Control Test Methods and Minimum Testing Frequencies
10-30	Geonet-Geotextile Composite Ply Adhesion and Transmissivity Factory Quality Control Test Methods and Minimum Testing Frequencies
10-31	Geonet-Geotextile Composite Quality Assurance Test Methods and Minimum Testing Frequencies
10-32	Gypsum Quality Assurance Test Methods and Minimum Testing Frequencies
10-33	Underdrains and Outlets Quality Assurance Test Methods and Minimum Testing Frequencies
10-34	Foundation Drain Quality Assurance Test Methods and Minimum Testing Frequencies
10-35	Piezometer Quality Assurance Test Methods and Minimum Testing Frequencies
10-36	Flowable Fill Quality Assurance Test Method and Minimum Testing Frequency

LIST OF FIGURES

Figure Title

SECTION 1

- 1-1 Aerial Photograph
- 1-2 Facility Aerial Photograph
- 1-3 Phase II West Restricted Use Area and North and South Gypsum Stack Areas
- 1-4 Aerial Photograph of Phosphogypsum Stack System
- 1-5 Monitor Well Location Plan
- 1-6 Geophone Location Plan
- 1-7 Schematic Plan of Phase III Extension Foundation Drains
- 1-8 Phase III East Area III-2 and Area 4 Piezometer Location Plan
- 1-9 Recovery Well P-4B Zone of Capture

SECTION 2

- 2-1 Location Map
- 2-2 USGS Quadrangle Map
- 2-3 Topographic Survey
- 2-4 Aerial Photograph
- 2-5 Unmined Areas and Former Kingsford Beneficiation Plant
- 2-6 Location of Extension Area Cut-Off Wall
- 2-7 Zoning and Land Use Designations
- 2-8 Land Use Map
- 2-9 Flood Hazard Areas Within Phase IV Extension
- 2-10 Tax Parcel Map

SECTION 3

- 3-1 Phase IV Stack Extension Development Area Boundary
- 3-2 Schematic Plan of Phase IV Gypsum Stack Extension Area
- 3-3 Schematic Plan and Details of Phase IV Gypsum Stack Extension Area
- 3-4 Schematic Cross Sections of Phase IV Gypsum Stack Extension Area
- 3-5 Location of Water Supply Wells
- 3-6 Geophone Location Plan
- 3-7 Schematic Plan of Foundation Drains
- 3-8 Schematic Plan of Foundation Piezometers
- 3-9 Schematic Foundation Piezometer Details
- 3-10 Schematic Plan and Section of Header Pipe Modifications
- 3-11 Schematic Section of Outlet Pipe Extension Modifications
- 3-12 Stormwater Drainage Ditch and EDI Watershed Boundaries
- 3-13 Stage-Storage Curves for Stormwater Drainage Ditches and EDI
- 3-14 Existing and New Monitor Wells
- 3-15 Plan of Gypsum Stack with Phase IV Extension at Final Height
- 3-16 Cross Sections of Combined Phase III Stack and Phase IV Extension at Final Height

LIST OF FIGURES

Figure Title

SECTION 4

- 4-1 Generalized Hydrogeologic Profile
- 4-2 Boring Location Plan
- 4-3 Contour Map of Top of Undifferentiated Arcadia Formation from Prospect Borings
- 4-4 Contour Map of Top of Undifferentiated Arcadia Formation
- 4-5 Contour Map of Top of Undifferentiated Peace River Formation
- 4-6 Monitor Well Location Plan
- 4-7 Piezometric Water Elevations and Groundwater Quality vs Depth at Well Cluster NWC-44
- 4-8 Piezometric Water Elevations and Groundwater Quality vs Depth at Well Cluster NWC-45
- 4-9 Recovery Well P-4B Zone of Capture
- 4-10 Favorability of Florida Geology to Sinkhole Formation
- 4-11 Structural Features of Peninsular Florida
- 4-12 Fracture Pattern Map for Central and North Florida
- 4-13 Former Topographic Depressions
- 4-14 Sinkhole Frequency Map
- 4-15 Photolinears
- 4-16 Photolinears and Former Topographic Depressions
- 4-17 Boring and Piezometer Locations at Photolinear Intersections and Topographic Depressions
- 4-18 Boring Locations at Topographic Depression III-1
- 4-19 Soil Boring Profiles at Topographic Depression III-1
- 4-20 Boring Locations at Topographic Depression IV-1
- 4-21 Soil Boring Profiles at Topographic Depression IV-1
- 4-22 Boring Location at Topographic Depression IV-2
- 4-23 Soil Boring Profiles at Topographic Depression IV-2
- 4-24 Boring Locations at Topographic Depressions IV-3 and IV-4
- 4-25 Soil Boring Profiles at Topographic Depression IV-3 and IV-4
- 4-26 Photolinears Intersections
- 4-27 Boring Locations at Photolinear Intersections IV-9, IV-10, and IV-11
- 4-28 Soil Boring Profiles at Photolinear Intersections IV-9, IV-10, and IV-11
- 4-29 Boring Locations at Photolinear Intersections A1, A2, A3, and I3
- 4-30 Soil Boring Profiles at Photolinear Intersections A1, A2, A3, and I3
- 4-31 2014 Microgravity Survey Location Plan
- 4-32 2014 Microgravity Survey Residual Gravity Map
- 4-33 2021 Microgravity Survey Location Plan
- 4-34 2021 Microgravity Survey Residual Gravity Map
- 4-35 Features Identified for Investigation within Phase IV Extension

LIST OF FIGURES

Figure Title

SECTION 4 (cont'd)

- 4-36 Soil Boring Profiles at Microgravity Features MG-IV-1, MG-IV-2, MG-IV-3, MG-IV-4, MG-IV-6, and MG-IV-7
- 4-37 Soil Boring Profiles at Microgravity Features MG-IV-8, MG-IV-9, NG-IV-11, MG-IV-12, and MG-IV-13
- 4-38 Soil Boring Profiles at Microgravity Features MG-IV-5, MG-IV-15, and MG-IV-16
- 4-39 Seismic Reflection Targets
- 4-40 Seismic Reflection Features DT-IV-12 and DT-IV-13 Boring Location Plan
- 4-41 Boring Profiles at Seismic Reflection Feature DT-IV-13
- 4-42 Boring Profiles at Seismic Reflection Feature DT-IV-12
- 4-43 Seismic Reflection Feature DT-IV-7 Boring Location Plan
- 4-44 Boring Profiles at Seismic Reflection Feature DT-IV-7
- 4-45 Seismic Reflection Feature DT-IV-11 Boring Location Plan
- 4-46 Boring Profiles at Seismic Reflection Feature DT-IV-11
- 4-47 Seismic Reflection Feature DT-IV-4 Boring Location Plan
- 4-48 Boring Profiles at Seismic Reflection Feature DT-IV-4
- 4-49 Seismic Reflection Feature DT-IV-8 Boring Location Plan
- 4-50 Boring Profiles at Seismic Reflection Feature DT-IV-8
- 4-51 Seismic Reflection Feature DT-IV-5 Boring Location Plan
- 4-52 Boring Profiles at Seismic Reflection Feature DT-IV-5
- 4-53 Boring Profiles at Seismic Reflection Feature DT-IV-10
- 4-54 Boring Profiles at Seismic Reflection Feature DT-IV-10
- 4-55 Top of Undifferentiated Arcadia Formation Contours at Feature DT-IV-10
- 4-56 Boring Profiles at Seismic Reflection Features DT-IV-1, DT-IV-2, DT-IV-3, DT-IV-6, DT-IV-9, and DT-IV-14

SECTION 5

- 5-1 Boring Location Plan
- 5-2 Surface Depression and Photolinear Intersection Boring Location Plan
- 5-3 Soft Clay Exploration Boring Location Plan
- 5-4 Soft Clay Exploration Cone Penetration Test Sounding Location Plan
- 5-5 Piezometer Location Plan
- 5-6 Pre-mining Aerial Photograph with Surface Depression and Photolinear Boring Locations
- 5-7 Pre-mining USGS Quadrangle Map with Surface Depression and Photolinear Boring Locations
- 5-8 Soil Boring Profiles Along Perimeter Earthen Dike
- 5-9 Soil Boring Profiles Along Perimeter Earthen Dike
- 5-10 Soil Boring Profiles Along Perimeter Earthen Dike
- 5-11 Soil Boring Profiles Along North Segment of Cut-off Wall

LIST OF FIGURES

Figure Title

SECTION 5 (cont'd)

- 5-12 Soil Boring Profiles Along East Segment of Cut-off Wall
- 5-13 Soil Boring Profiles Along South Segment of Cut-off Wall
- 5-14 Soil Boring Profiles for Soft Clay Exploration
- 5-15 Soil Boring Profiles for Soft Clay Exploration
- 5-16 Soil Boring Profiles for Soft Clay Exploration
- 5-17 Soil Boring Profiles and CPT Soundings for Soft Clay Exploration
- 5-18 Soil Boring Profiles and CPT Soundings for Soft Clay Exploration
- 5-19 Soil Boring Profiles and CPT Soundings for Soft Clay Exploration

SECTION 6

- 6-1 Water Content Versus Fines Content for Bone Valley Member Soils
- 6-2 Water Content Versus Fines Content for Undifferentiated Peace River Formation Soils
- 6-3 Water Content Versus Fines Content for Undifferentiated Arcadia Formation Soils
- 6-4 Particle-Size Distributions for Fill
- 6-5 Particle-Size Distributions for Undifferentiated Surficial Soils
- 6-6 Particle-Size Distributions for Bone Valley Member Soils
- 6-7 Particle-Size Distributions for Bone Valley Member Soils
- 6-8 Particle-Size Distributions for Bone Valley Member Soils
- 6-9 Particle-Size Distributions for Undifferentiated Peace River Formation Soils
- 6-10 Particle-Size Distributions for Undifferentiated Peace River Formation Soils
- 6-11 Particle-Size Distributions for Undifferentiated Arcadia Formation Soils
- 6-12 Plasticity Chart for Natural Ground Soils
- 6-13 Plasticity Index Versus Fines Content for Natural Ground Soils
- 6-14 Carbonate Content Versus Fines Content for Natural Ground Soils
- 6-15 Effective Stress Paths from CIUC Triaxial Tests on Bone Valley Member Soils
- 6-16 Stress-Strain Behavior from CIUC Triaxial Tests on Bone Valley Member Soils
- 6-17 $p' - q$ Plot for Bone Valley Member Soils
- 6-18 Particle-Size Distributions for Cast Overburden Soils
- 6-19 Particle-Size Distributions for Cast Overburden Soils
- 6-20 Effective Stress Paths from CIUC Triaxial Tests on SP-SM Cast Overburden Soils
- 6-21 Stress-Strain Behavior from CIUC Triaxial Tests on SP-SM Cast Overburden Soils
- 6-22 $p' - q$ Plot for SP-SM Cast Overburden Soils
- 6-23 Effective Stress Paths from CIUC Triaxial Tests on SC Cast Overburden Soils
- 6-24 Stress-Strain Behavior from CIUC Triaxial Tests on SC Cast Overburden Soils

LIST OF FIGURES

<u>Figure</u>	<u>Title</u>
---------------	--------------

SECTION 6 (cont'd)

6-25	p' – q Plot for SC Cast Overburden Soils
6-26	Particle-Size Distributions for Sand Tailings
6-27	Particle-Size Distributions for Sand Tailings
6-28	Direct Shear Tests Between Sand Tailings and HDPE Liner
6-29	Direct Shear Tests Between Sand Tailings and HDPE Liner
6-30	Particle-Size Distribution of Phosphogypsum
6-31	Standard Proctor Compaction Curve for Phosphogypsum
6-32	Hydraulic Conductivity for Remolded Phosphogypsum
6-33	Vertical Hydraulic Conductivity vs Void Ratio of Phosphogypsum
6-34	Direct Shear Tests Between Phosphogypsum and HDPE Liner
6-35	Effective Stress Paths from CIUC Triaxial Tests for Very Loose Phosphogypsum
6-36	Stress-Strain Behavior from CIUC Triaxial Tests for Very Loose Phosphogypsum
6-37	p' – q Plot for Very Loose Phosphogypsum
6-38	Effective Stress Paths from CIUC Triaxial Tests for Loose Phosphogypsum
6-39	Stress-Strain Behavior from CIUC Triaxial Tests for Loose Phosphogypsum
6-40	p' – q Plot for Loose Phosphogypsum
6-41	Effective Stress Paths from CIUC Triaxial Tests for Medium Dense Phosphogypsum
6-42	Stress-Strain Behavior from CIUC Triaxial Tests for Medium Dense Phosphogypsum
6-43	p' – q Plot for Medium Dense Phosphogypsum
6-44	Effective Stress Paths from CIUC Triaxial Tests for Very Dense Phosphogypsum
6-45	Stress-Strain Behavior from CIUC Triaxial Tests for Very Dense Phosphogypsum
6-46	p' – q Plot for Very Dense Phosphogypsum

SECTION 7

7-1	Schematic Plan of Existing Process Water Conveyance System Including Phase III Extension
7-2	Schematic Plan of Phase III Process Water Conveyance System Prior to Activation of Phase IV Extension
7-3	Schematic Plan of Process Water Conveyance System with Phase IV Extension at Top Elevation 370'
7-4	Schematic Plan of Process Water Conveyance System and Phase IV Extension at Maximum Stack Height

LIST OF FIGURES

<u>Figure</u>	<u>Title</u>
---------------	--------------

SECTION 7 (cont'd)

- | | |
|------|--|
| 7-5 | Profile Along East Flume Structure |
| 7-6 | Stage vs Time for 12-Inch/24-Hr Storm (Scenario B) at Cooling Pond, Phase III Extension and South Gypsum Stack |
| 7-7 | Stage vs Time for 12-Inch/24-Hr Storm (Scenario D) at Cooling Pond, Phase III Extension and South Gypsum Stack |
| 7-8 | Stage vs Time for 12-Inch/24-Hr Storm (Scenario F) at Cooling Pond, Phase III Extension and South Gypsum Stack |
| 7-9 | Stage vs Time for 12-Inch/24-Hr Storm (Scenario B) at Phase IV Extension Conveyance Ditch System |
| 7-10 | Stage vs Time for 12-Inch/24-Hr Storm (Scenario D) at Phase IV Stack Conveyance Ditch System |
| 7-11 | Stage vs Time for 12-Inch/24-Hr Storm (Scenario F) at Phase IV Extension Conveyance Ditch System |
| 7-12 | Perimeter Earthen Dike Cross-Section for Stability Analysis |
| 7-13 | Perimeter Earthen Dike Operating Condition Stability Analyses |
| 7-14 | Perimeter Earthen Dike Stability Analyses |
| 7-15 | Modifications to Gypsum Starter Dike During Stack Operation |
| 7-16 | Schematic Cross Section of Foundation Drainage System |
| 7-17 | Gypsum Dry Density vs. Depth |
| 7-18 | Gypsum Properties vs. Depth |
| 7-19 | Seepage Analysis for Phase IV Gypsum Stack Extension |
| 7-20 | Stability Analysis for Phase IV Gypsum Stack Extension |
| 7-21 | Foundation Stability Analysis for Phase IV Extension |

SECTION 8

- | | |
|------|---|
| 8-1 | Schematic Diagram of Gypsum Slurry Pumping System |
| 8-2 | Upstream Method of Construction |
| 8-3 | Schematic Plan of Phase IV Gypsum Stack Extension at Height of 40 Feet |
| 8-4 | Schematic Plan of Phase IV Gypsum Stack Extension at Height of 200 Feet |
| 8-5 | Schematic Plan of Phase IV Gypsum Stack Extension at Height of 300 Feet |
| 8-6 | Existing Monitor Well Location Plan |
| 8-7 | Monitor Well Location Plan |
| 8-8 | Standby Recovery Well P-6 Zone of Capture |
| 8-9 | Surficial Aquifer and Intermediate Aquifer I1-Zone Monitor Well Schematic |
| 8-10 | Floridan Aquifer F2-Zone Monitor Well Schematic |
| 8-11 | Flow Path from Area A-11 to Outfall D-006 and Surface Water Monitoring Stations |

LIST OF FIGURES

Figure Title

SECTION 9

- 9-1 Conceptual Closure at End of Life Phase IV Extension
- 9-2 Conceptual Cross Section and Details for Stack Closure
- 9-3 Conceptual Details for Closure of Drainage Swales
- 9-4 Conceptual Detail for Side Slope Drain
- 9-5 Conceptual Detail for Closure of Seepage Collection Ditch

LIST OF APPENDICES

<u>Appendix</u>	<u>Title</u>
A	Monitor Well Groundwater Quality Trend Graphs
B	Monitor Well Groundwater Quality Tabulated Data
C	Property Deed
D	Well Construction and Abandonment Documentation
E	Water Balance
F	Investigation of Topographic Depressions
G	Standard Penetration Test Boring Logs for Perimeter Earthen Dike, Topographic Depression, Photolinear Intersection, Monitor Well, and Cut-off Wall Exploration
H	Standard Penetration Test Boring Logs for Seismic Reflection, Microgravity, and Soft Clay Exploration
I	Undisturbed Tube Sample Extrusion Test Reports
J	Cone Penetration Test Logs
K	Piezometer Installation Information and Water Levels
L	Previous Microgravity Survey
M	Microgravity Survey Within Phase IV Phosphogypsum Stack Extension Area
N	Seismic Reflection Survey
O	Consolidation Tests
P	Analysis of Existing Wetland Hydroperiods

Mosaic Fertilizer, LLC
FDEP Construction/Operation Permit Application
New Wales Phase IV Gypsum Stack Extension
File Number: 21-13-0122

Section 1
Overview of New Wales
Stack System and Plan of Study
Page 1-1 of 30

Section 1

OVERVIEW OF NEW WALES GYPSUM STACK SYSTEM AND PLAN OF STUDY FOR FDEP PERMIT APPLICATION

The Mosaic Fertilizer, LLC (Mosaic) New Wales facility is located on County Road 640 West (Lithia-Pinecrest Road). It lies to the southwest of Mulberry, Florida, within Polk County and just east of the Polk-Hillsborough County line. The facility is about ½ mile south of County Road 640 West and 2 to 4 miles west of State Road 37, which are the two closest public roads. The facility is located about ¾ mile from the closest abutting property located northeast of the facility.

The New Wales facility manufactures solid ammoniated phosphate fertilizers [mono-ammonium phosphate (MAP), diammonium phosphate (DAP), and MicroEssentials®] and animal feed ingredients (monocalcium phosphate, dicalcium phosphate, and sodium calcium phosphate).

The location and boundary of the 31,640-acre Mosaic landholding, which encompasses and surrounds the New Wales facility, are shown on the location map in Figure 1-1.¹ The New Wales facility comprises the following elements (see Figure 1-2):

- 385-acre closed North Gypsum Stack including the lined auxiliary holding ponds designated LESP-1 and LESP-2 atop the stack;
- 704-acre South Gypsum Stack;
- 226-acre Phase III Gypsum Stack Extension;
- 411-acre cooling pond and associated west, east, and north cooling channels;
- 94-acre below-grade auxiliary holding pond (AHP);
- 235-acre plant site;
- 76-acre below-grade emergency diversion impoundment area (EDI); and
- 122 acres of land within the facility not specifically designated.

1.1 Facility History

The New Wales facility was originally constructed by International Minerals and Chemical Corporation (IMC) and began operation in 1975. The facility was part of the merger between IMC and Cargill's fertilizer division in October 2004 that resulted in the formation of The Mosaic Company and its affiliates and subsidiaries, including Mosaic Fertilizer, LLC. Mosaic has operated the facility since that time to manufacture ammoniated phosphate fertilizer and animal feed ingredients. Operations to support the manufacturing process include phosphoric acid production,

¹ The 2,065-acre New Wales facility depicted on Figure 1-1 is an area that has been designated by Mosaic to contain the New Wales facility manufacturing areas and gypsum stack system. The facility area is not a permit or regulatory defined area.

Mosaic Fertilizer, LLC
FDEP Construction/Operation Permit Application
New Wales Phase IV Gypsum Stack Extension
File Number: 21-13-0122

Section 1
Overview of New Wales
Stack System and Plan of Study
Page 1-2 of 30

sulfuric acid production, sulfur prill storage and melting, molten sulfur storage, and phosphate rock storage and grinding.

1.1.1 North Gypsum Stack

The North Gypsum Stack was activated in April 1975, and was subsequently expanded or modified in several phases. Following closure construction, it has a base area of 385 acres and a top area of 111 acres. The stack was actively utilized from April 1975 through 1992, shortly after the Phase I portion of the South Gypsum Stack was activated. From then until June 1994, the North Gypsum Stack was used intermittently. In June 1994, a sinkhole occurred within the North Gypsum Stack and, hence, gypsum deposition into the stack was suspended. The sinkhole was repaired between June 1994 and April 1995. Gypsum deposition resumed in June 1995 in preparation for closure and continued through June 2000. Closure of the stack was initiated shortly thereafter and was substantially completed in September 2005. The 234-acre side slope and 41-acre top gradient watersheds (excluding the 70-acre LESP-1 and LESP-2) were removed from the watershed of the gypsum stack system in August 2005, when stormwater runoff from these areas was routed to the freshwater pond located north of the North Gypsum Stack.

As part of closure for the North Gypsum Stack, two lined auxiliary holding ponds, designated LESP-1 and LESP-2, were permitted and constructed atop the closed North Gypsum Stack and became part of the active gypsum stack system. Construction of LESP-1 and LESP-2 was initiated in February 2001. Construction of LESP-1 was substantially completed in August 2001, when LESP-1 was activated for the storage of process water with the crest of the perimeter and partition dikes and the overflow spillway from LESP-1 to LESP-2 had not yet been completed. Grading of the LESP-2 pond bottom and construction of the surrounding perimeter gypsum dike was completed in September 2001. Installation of the 60-mil HDPE liner in LESP-2 began in August 2001 and was completed in October 2001. LESP-2 was activated for process water storage in November 2001. The construction of LESP-1 and LESP-2 portions of the Phase I closure of the North Gypsum Stack was substantially completed in February 2002.

LESP-1 and LESP-2, including the crest of the perimeter containment dikes, originally occupied an area of 70 acres and had an original storage capacity of 1,504 acre-feet. At maximum normal storage depths (i.e., with minimum 3-foot freeboard) of 37 and 29 feet, LESP-1 and LESP-2 provide 722 and 782 acre-feet of water storage volume, respectively.

In September 2013, water level monitoring indicated that a thin erosion channel had developed at the previously repaired erosion cavity in the confining unit beneath the stack associated with the June 1994 sinkhole. Maintenance grouting was initiated in January 2015 and completed in June 2015. The closed top gradient was disturbed in the vicinity of the repair work over an area of about 10 acres. Restoration of the top gradient liner and soil cover was initiated in August 2016 and completed in January 2017.

The LESP-1 and LESP-2 perimeter containment dike crest and HDPE liner on the inside slope of the dike was raised up to 13 feet and re-constructed to a uniform elevation of about 350 feet (NGVD) to restore a portion of the storage capacity lost over time due to differential settlement on top of the closed stack. The re-construction increased the storage capacity by 574 acre-feet to a total of 1,224 acre-feet. The Q4 2022 hydrographic survey performed by Pickett and Associates

Mosaic Fertilizer, LLC
FDEP Construction/Operation Permit Application
New Wales Phase IV Gypsum Stack Extension
File Number: 21-13-0122

Section 1
Overview of New Wales
Stack System and Plan of Study
Page 1-3 of 30

showed a combined water inventory of 1,060 acre-feet in LESP-1 and LESP-2. Re-construction of the perimeter dikes and HDPE liner was initiated in August 2018 and completed in February 2019. Because of the outward movement of the perimeter dike crest required to raise the dikes, the area occupied by the auxiliary holding ponds increased by 2 acres to 71 acres while the closed side slope area decreased by 2 acres to 273 acres.

1.1.2 South Gypsum Stack

Construction of the 394-acre lined Phase I expansion portion of the South Gypsum Stack was initiated in September 1990. The Phase I stack was divided into two similar-sized compartments designated the East Area and West Area. Construction for the West Area and East Area was completed in April 1992 and June 1992, respectively. Gypsum slurry was first introduced into the Phase I expansion in April 1992.

Construction of the 310-acre lined Phase II expansion portion of the South Gypsum Stack was initiated in September 2001. The Phase II stack was divided into two similar-sized compartments, also designated the East Area and West Area. The East Area was completed in September 2002 and filled with process water shortly thereafter. The West Area was further divided into two similar-sized cells to facilitate operations. The north cell of the West Area was completed and activated in July 2003. The south cell was completed and activated in November 2003.

An anomaly developed in the Phase I West Area of the South Gypsum Stack in February 2004. The anomaly was repaired by a grouting program undertaken from June through October 2004. In order to optimize water storage in the Phase I West Area abutting the repaired area, the top of the stack was re-graded and lined with a 60-mil HDPE liner to create a 19-acre lined auxiliary holding pond, designated LESP-3. LESP-3 was activated in 2005 and remained in use until June 2018 when it was incorporated into the Phase II West-North settling compartment.

Early closure of the 55-acre northwest corner of the South Gypsum Stack (see Figure 1-2) was initiated in October 2013 to reduce the watershed of the gypsum stack system. Closure construction was completed in February 2021. Runoff from the closed surfaces is now routed by pipes to the west stormwater drainage ditch, then flows southward into the extension of the west drainage ditch along the south perimeter of the Phase III gypsum stack extension, and then enters the southwest corner of the EDI through a culvert. Accumulated stormwater is transferred from the EDI to the Area A-11 to Area K-4 drainage ditch by pumping.

A water loss incident (WLI) occurred in the Phase II West Area of the South Gypsum Stack in August 2016. Gypsum placement into the West Area ceased at that time. Repair of the sinkhole in the stack and groundwater recovery was undertaken in accordance with the October 24, 2016 Consent Order 16-1356 between Mosaic and the Florida Department of Environmental Protection (Department) and the Corrective Action and Grouting Plan (CAGP). Grouting operations substantially were completed in March 2018. Controlled filling of the remaining cavity in the stack above the grout with sedimented gypsum was initiated shortly thereafter. Filling of the cavity to the end of the CAGP filling period elevation of 320 feet (NGVD) was completed in May 2018. The Remedial Summary Report (RSR) documenting the work efforts and groundwater monitoring performed for the CAGP was submitted to the FDEP in June 2018. FDEP approval of the RSR and recommendations was received by Mosaic in July 2018.

Mosaic Fertilizer, LLC
FDEP Construction/Operation Permit Application
New Wales Phase IV Gypsum Stack Extension
File Number: 21-13-0122

Section 1
Overview of New Wales
Stack System and Plan of Study
Page 1-4 of 30

Post-CAGP filling with sedimented gypsum to Elevation 330 feet (NGVD) was completed in January 2019. Mechanical grading and placement of gypsum from Elevation 330 feet (NGVD) at the work pad surrounding the repair area to 350 feet (NGVD) at the center of the area in preparation for closure was completed in March 2019. The repair area has been and will be periodically filled and re-graded to maintain a mound such that drainage continues to occur from the center to the perimeter of the area. Closure of the 43-acre Restricted Use Area atop the Phase II West Area established as part of the recommendations of the RSR (see Figure 1-3) is currently scheduled to start in CY2024 with closure construction tentatively scheduled for completion in CY2028.

Construction of the 25-acre lined Phase II West-South Area for gypsum stacking was initiated in July 2018 and completed in June 2019. Construction of the 40-acre lined Phase II West - North Area for gypsum stacking, which encompasses LESP-3, was initiated in July 2019 and was substantially completed in December 2020. Figure 1-3 depicts the base areas of the Phase II West - South and Phase II West - North gypsum stack areas.

Signature Acoustic Emissions (SAEs) were detected by the existing Passive Seismic Monitoring System at four areas within the South Gypsum Stack designated Areas of Interest (AOI) 1, 2, 3 and 4.² The locations are depicted on Figure 1-4.

- Area of Interest 1. Seven SAEs with energies of 3 to 1,725 joules, all less than the 2,000 joules energy considered a potential indicator of subsurface activity, were detected in October 2021 within an approximately 165-foot diameter area between elevations -267 and +163 feet (NGVD) below the upper portion of the south slope of the SGS East compartment. As presented in the June 23, 2022, Ardaman report titled "Results of Exploration and Findings at Area of Interest 1 (AOI1) Identified by Reported Signature Acoustic Emissions Passive Seismic Monitoring System", the initial exploration in AOI1 provided multiple indications of the absence of a breach in the liner system or a void above the liner at or in the vicinity of AOI1. That observation was based on core recovery, observed condition of the recovered gypsum cores, absence of voids or cavities detected while drilling, absence of drilling fluid circulation losses in gypsum in the lower portion of the borehole, and the measured piezometric water elevation in the borehole near the base of the stack. Twenty-two additional SAEs were detected at AOI1 over the 22-month period from November 2021 through August 2023 with energies varying from <1 to 1,664 joules.

² The Passive Seismic Monitoring System (PSMS) consists of an array of 40 receiver stations equipped with subsurface geophones and associated data collection systems around the perimeter of the existing Phase I/II stack and Phase III Extension gypsum stack (see locations on Figure 1-4). The subsurface monitoring system is a passive, automated, real-time surveillance program for early detection of subsurface activity within the boundaries of Phase I/II and Phase III Extension gypsum stack. At each of the 40 stations, an array of multiple 3-component seismometers is grouted into a borehole. At 12 of the 40 stations the geophone array consists of 2 levels of geophone assemblies located at depths of 125 and 175 feet below ground surface (MSI-18 to MSI-22 and MSI-25 to MSI-31). At the remaining 28 stations (MSI-41 through MSI-68), the array has 3 levels of geophone assemblies at approximately 100, 200 and 300 feet below ground surface.

Mosaic Fertilizer, LLC
FDEP Construction/Operation Permit Application
New Wales Phase IV Gypsum Stack Extension
File Number: 21-13-0122

Section 1
Overview of New Wales
Stack System and Plan of Study
Page 1-5 of 30

Subsequent to the initial exploration, vibrating wire (VW) piezometers were installed to measure piezometric water levels in gypsum above the liner, in cast overburden soils underlying the liner, and in the upper portion of the Undifferentiated Arcadia Formation. On-going piezometric water level monitoring continues to indicate the absence of a breach in the liner system or anomalous subsurface conditions at AOI1.

- Area of Interest 2. Several hundred SAEs were detected in March 2022 below the southern portion of the Phase II East Area within a 550-foot diameter area between elevations -1,300 and +25 feet (NGVD) with sufficient energy, recurrence and similar spatial positioning in the limestone formations to identify an area of interest and warrant investigation. Most of the SAEs (89 percent) were less than 200 joules, less than 10 percent of the 2,000 joules energy considered a potential indicator of subsurface activity. Eight SAEs had energies above the 2,000-joule threshold between 2,295 and 7,012 joules. Exploratory borings indicated that a cavity existed in gypsum at the base of the stack and that the HDPE liner was breached. An exclusion zone was established around AOI2, a work pad with gypsum dikes was constructed to separate the operational portion of the Phase II East Area from AOI2, and a Corrective Action Grouting Plan was submitted, in June 2022, to the FDEP. Stabilization grouting, consisting of the bulk filling of the cavity in the base of the stack with concrete grout, was initiated in July 2022 and completed in November 2022. Pressure grouting of the foundation soils and Intermediate Aquifer System upper confining unit was initiated in January 2023 with completion expected in February 2024. Post-repair performance monitoring of the grouted cavity will be undertaken with piezometers to measure water levels in the gypsum stack, in cast overburden soils underlying the liner, and in the Undifferentiated Arcadia Formation within the upper confining unit. Post-repair use of the top of the South Gypsum Stack at AOI2 will be undertaken in accordance with conditions yet to be established between Mosaic and the FDEP.
- Area of Interest 3. Seven SAEs with low energies of 4 to 180 joules were detected in March 2022 southwest of AOI2 below the southwest portion of the Phase II East Area within a 550-foot diameter area between elevations -850 and -250 feet (NGVD). Thirty-two SAEs had been detected in that area between June 2020 and July 2021 with energies up to 1,112 joules, but no SAEs were detected over the seven-month period from August 2021 through February 2022. Given the proximity to AOI2 and prior SAEs, two inclined boreholes were advanced in gypsum and two VW piezometers were installed in gypsum above the liner. Findings from observations of the gypsum core samples recovered from the boreholes and piezometric water elevations measured by piezometers do not indicate the presence of a liner breach. Thirty-five additional SAEs have been detected at AOI3 over the 17-month period from February 2022 through August 2023 all with low energies varying from <1 to 180 joules.

On-going piezometric water level monitoring continues to indicate the absence of a breach in the liner at AOI3. A microgravity survey in the vicinity of AOI3 will be performed to further check for a detectable cavity in gypsum at the base of the

Mosaic Fertilizer, LLC
FDEP Construction/Operation Permit Application
New Wales Phase IV Gypsum Stack Extension
File Number: 21-13-0122

Section 1
Overview of New Wales
Stack System and Plan of Study
Page 1-6 of 30

stack. Future use of the top of the South Gypsum Stack at AOI3 will be undertaken in accordance with conditions yet to be established between Mosaic and the FDEP.

- Area of Interest 4. Sixty-one SAEs with energies of up to 2,324 joules were detected in Q4 2022 below the Phase II-West North Area within a 272-foot diameter area between elevations -1,300 and -50 feet (NGVD) with sufficient energy, recurrence and similar spatial positioning in the limestone formations to identify an area of interest and warrant investigation. Most of the SAEs (78 percent) were less than 200 joules, less than 10 percent of the 2,000 joules energy considered a potential indicator of subsurface activity. One SAE had energy above the 2,000-joule threshold at 2,324 joules. Over 98 percent of the SAEs were located within the Avon Park Formation at depths between 570 and 1,440 feet below the liner on the base of the South Gypsum Stack and between 750 and 1,620 feet below the additional liner on the base of the Phase II West-North stack area. Nine additional SAEs were detected in early January 2023. Three of the nine were above 2,000 joules with energies of 4,340 to 6,860 joules and were located within the Avon Park Formation. Based on the SAEs that occurred in early January 2023, Ardaman provided engineering recommendations to Mosaic on January 20, 2023, in a report titled "Recommendations for Investigation Plan at Area of Interest 4 (AOI4), New Wales Plant, South Phosphogypsum Stack, Phase II West-North Area". The recommendations included removing process water from Phase II West-North Area Settling compartment and performing a subsurface exploration program to determine if a subsurface feature or cavity exists in the vicinity of AOI4.

An additional 109 SAEs were subsequently detected in AOI4 through August 2023 with energies varying from <1 to 34,987 joules. Most of the SAEs (95, or 87 percent) were less than 200 joules, less than 10 percent of the 2,000 joules energy considered a potential indicator of subsurface activity. Twelve SAEs were between 200 and 2,000 joules and two SAEs were above the 2,000-joule threshold with energies of 2,116 and 34,987 joules. The 34,987 joules SAE occurred in March 2023 in the Avon Park Formation at Elevation -800 feet (NGVD), 940 feet below the liner on the base of the South Gypsum Stack and 1,120 feet below the additional liner on the base of the Phase II West-North stack area.

An initial subsurface exploration program consisting of vertical and inclined core borings and installation of vibrating wire piezometers and a stability monitoring instrument was completed in July 2023. The second phase of the exploration program was started in November 2023. In December 2023 one of second phase inclined core holes encountered a complete loss of drilling fluid circulation and cavity confirming a breach in the HDPE liner at the base of the gypsum stack caused by an anomaly in the underlying foundation. A letter confirming a critical condition at AOI4 was submitted to the Department on December 14, 2023. The subsurface exploration program intended to estimate the size and characteristics of the anomaly (to develop a CAGP for the Department's review) is in-progress.

Mosaic suspended gypsum deposition and process water storage within the 40-acre Phase II-West North Area in January 2023. Future use of the Phase II-West

Mosaic Fertilizer, LLC
FDEP Construction/Operation Permit Application
New Wales Phase IV Gypsum Stack Extension
File Number: 21-13-0122

Section 1
Overview of New Wales
Stack System and Plan of Study
Page 1-7 of 30

North Area will be undertaken in accordance with conditions yet to be established between Mosaic and the FDEP.

1.1.3 Phase III Extension

The Phase III Extension is a 226-acre area abutting the south side of the South Gypsum Stack. Construction of the east portion of the Phase III Extension, comprising 121 acres of lined gypsum stack area, was initiated in March 2019. Construction and activation is scheduled in phases, with three of five phases already activated. The phases are described below and denoted on Figure 1-4.

- Construction of the 24-acre lined Area SG-1 portion within the 76-acre lined Phase III East-North Area was completed in May 2022. Area SG-1 was activated in September 2022.
- The remaining 52-acre portion of the Phase III East-North Area was completed in December 2022 and activated in January 2023. The perimeter gypsum dike has been raised to about Elevation 194 feet (NGVD) as of mid-December 2023, approximately 22 feet above the perimeter earthen dike, with ponded water atop the stack at about Elevation 174 feet (NGVD).
- Construction of the 45-acre lined Phase III East-South Area was completed in May 2023. The area was activated in August 2023.
- Construction of the Phase III West-North Area, comprising a lined area of 30 acres, is scheduled for completion in December 2024.
- Construction of the Phase III West-South Area, comprising a lined area of 11 acres, has not yet been scheduled.

Ground improvement construction in two paleo-sink features (Area 4 and Area III-2) within the Phase III East Extension was undertaken to restore the structural and hydrogeologic characteristics of the Intermediate Aquifer System upper confining unit and maintain separation between the surficial soils and the underlying limestones within the Floridan Aquifer System. Area 4 is located below the toe of slope of the South Gypsum Stack at about the mid-point of the south slope where the Phase III Extension will overlap the existing stack. Area III-2 is located within the central portion of the Phase III Extension. Construction was completed in July 2022 in accordance with design drawings, specifications, and stabilization plan reviewed and approved by the Florida Department of Environmental Protection. The stabilization plan in Area 4 included: (i) installing overlapping soilcrete columns within the upper confining unit over an area of 0.2-acres between elevations -20 feet to +100 feet (NGVD) using jet grouting; (ii) injecting cementitious grout under high pressure into the upper confining unit from grout casings advanced from a work pad surrounding the area over an area of 1.6 acres between elevations -30 feet to +100 feet (NGVD); (iii) placing bentonite grout in the grout holes from a minimum of 10 feet below the HDPE liner on the base of the South Gypsum Stack to Elevation 155 feet (NGVD); (iv) installing a 0.7-acre 2-foot-thick gravel drain system in gypsum at Elevation 155 feet (NGVD) above the grouted area to maintain a piezometric water elevation of 157 feet (NGVD); and (v) installing a 60-mil HDPE liner above the drain and on the south slope of the existing South Gypsum Stack to isolate the Phase

Mosaic Fertilizer, LLC
FDEP Construction/Operation Permit Application
New Wales Phase IV Gypsum Stack Extension
File Number: 21-13-0122

Section 1
Overview of New Wales
Stack System and Plan of Study
Page 1-8 of 30

III Extension from Area 4 and the existing stack.

The stabilization plan in Area III-2 included: (i) installing overlapping jet-grouted soilcrete columns around the perimeter of the aven between bottom elevations of +10 to +40 feet (NGVD) to top elevations of +50 to 54 feet (NGVD); (ii) installing overlapping deep soil-mixed soilcrete columns close to and within the aven over an area of about 0.2 acres from bottom elevations of -20 feet to +10 feet (NGVD) to the below-grade work pad at Elevation 74 feet (NGVD); (iii) placing a 1-acre minimum 20-foot thick compacted clay liner above the jet-grouted and soil-mixed soilcrete columns; (iv) installing a high tensile-strength woven geotextile reinforcement at the base of and within the clay liner; (v) installing a 100-mil high-density polyethylene geomembrane liner on top of the clay liner; and (vi) backfilling the excavation using soils previously excavated and stockpiled. The foundation drainage layer installed as part of Phase III Extension construction maintains the piezometric water elevation in the soils above the liner and grouted area between elevations 136 and 138 feet (NGVD).

Vibrating wire piezometers were installed at four stations in Area 4 and six stations in Area III-2 to monitor piezometric water elevations and allow Mosaic to respond appropriately to changes in performance of the areas. Each Area 4 station includes one piezometer tapping cast overburden soils and two piezometers tapping the upper and lower portions of the upper confining unit in the Undifferentiated Arcadia Formation for a total of 12 piezometers. Three of the stations are located in the grouted area and one station is located outside and adjacent to the grouted area. Four of the six stations in Area III-2 include one piezometer tapping cast overburden or backfilled soils and two piezometers tapping the upper and lower portions of the upper confining unit in the Undifferentiated Arcadia Formation. These stations are located outside and adjacent to the grouted area. Two of the six stations are located above the grouted area with one piezometer installed just above the 100-mil high-density polyethylene geomembrane liner. The six stations contain a total of 14 piezometers.

Each of the 26 piezometers consist of a pair of VW sensors to provide instrument redundancy. Cables extend from each sensor through 2-inch diameter conduits buried in soil below the Phase III Extension to readout stations located in the perimeter earthen dike toe road. Piezometric water levels are read and recorded at 4-hour intervals via an automated data acquisition system. Monitoring has been underway since August 2022 at the Area 4 stations and February 2023 at the Area III-2 stations. Performance to-date at both areas is satisfactory.

1.1.4 Emergency Diversion Impoundment

The emergency diversion impoundment (EDI) is located below-grade within an existing mine pit abutting the east side of the South Gypsum Stack (see Figure 1-4). It was approved for incorporation into the New Wales facility site-specific water management plan by the FDEP in March 2019 for enumerated emergency uses. The EDI occupies an area of about 57 acres at the maximum operating water elevation of 157.0 feet (NGVD) and is bordered: (i) on the east by an existing access road along the CSX railroad tracks in the northern portion and an existing earthen embankment dike and access road along the Area A-11 to Area K-4 drainage ditch in the southern portion; (ii) on the south by the existing earthen embankment dike and access road along the Area A-11 to Area K-4 drainage ditch; and (iii) on the west by the South Gypsum Stack perimeter earthen dike in the northern portion, the Phase III East perimeter earthen dike in the southern portion, and the EDI divider dike at the south end of the west wall. The area within the enclosing

Mosaic Fertilizer, LLC
FDEP Construction/Operation Permit Application
New Wales Phase IV Gypsum Stack Extension
File Number: 21-13-0122

Section 1
Overview of New Wales
Stack System and Plan of Study
Page 1-9 of 30

dikes/embankments is approximately 76 acres. In November 2021, the crest of the divider dike between the EDI and Phase III East Extension was raised from 158.0 feet (NGVD) to 160.0 feet (NGVD).

The EDI has not been activated for process water storage. It is available for emergency storage of up to 810 acre-feet of process water between the normal and maximum operating water elevations of 138.0 and 157.0 feet (NGVD), respectively.

1.2 Gypsum Stack System

The New Wales facility operates a gypsum stack system to manage by-product phosphogypsum generated during phosphoric acid production. The aerial photograph in Figure 1-4 identifies the locations of various components of the gypsum stack system including:

- the process water cooling pond and west cooling channel between the plant hot water discharge and the west end of the cooling pond;
- the east and north cooling channels downstream of the internal water level control structure;
- the South Gypsum Stack, which includes Phase I, Phase II, the eastern portion of the Phase III Extension, and will include the western portion of the Phase III Extension once constructed and activated;
- the two auxiliary holding ponds (LESP-1 and LESP-2) atop the closed North Gypsum Stack; and
- the below-grade auxiliary holding pond (AHP).

Operation of the gypsum stack system is subject to National Pollutant Discharge Elimination System (NPDES) industrial wastewater facility Permit FL0036421 for the New Wales facility. The existing permit became effective July 31, 2018 with an expiration date of July 30, 2023. A permit renewal application was submitted to the FDEP in a timely manner and pursuant to the provisions of Rule 62-620.335, Florida Administrative Code (F.A.C.); therefore, the existing permit is considered to be administratively continued. Mosaic received notification from the FDEP on May 3, 2023 that the renewal application has been determined to be complete. Mosaic acknowledges that the incorporation of the Phase IV Extension within the NPDES permit will occur, if approved, in a separate action following final issuance of the renewal permit that is currently being processed by the FDEP.

1.2.1 Cooling Pond System

The facility uses recirculated process water for phosphoric acid plant cooling and for transport of phosphogypsum to the South Gypsum Stack including the Phase III Extension. Process water is also utilized in the ball mill rock grinding system and in phosphoric acid production as a consumption measure to reduce the volume of process water within the gypsum stack system.

Mosaic Fertilizer, LLC
FDEP Construction/Operation Permit Application
New Wales Phase IV Gypsum Stack Extension
File Number: 21-13-0122

Section 1
Overview of New Wales
Stack System and Plan of Study
Page 1-10 of 30

The discharge of treated process water is authorized under Permit FL0036421 through the New Wales facility Outfall D-006.

The cooling pond system was activated in April 1975. The system was expanded or modified in several phases and presently occupies a total area of 411 acres that comprise a pondable area up to 289 acres and 122 acres of abutting land surfaces within the watershed of the cooling pond system. Heated process water is introduced into the cooling pond system at the north end of the west cooling channel at a flow rate between 100,000 and 175,000 gpm, depending upon P_2O_5 production rate. Process water flows from the west cooling channel into the serpentine channels on the south side of the cooling pond, then into the western portion of the cooling pond, then into the east cooling channel, and finally into the north cooling channel. Process water is returned to the plant using two pump stations located at the west end of the north cooling channel. An internal water level control structure is located at the south end of the east cooling channel. The structure allows the storage of water within the cooling pond at water elevations higher than in the downstream east and north cooling channels. The water level elevations in the cooling pond typically vary from 152.5 to 154.5 feet (NGVD). The water level elevations in the east and north cooling channels typically vary from 149 to 151 feet (NGVD). The South Gypsum Stack perimeter ditch system is connected to the cooling pond system via the east and west flume structures located on the north perimeter of the South Gypsum Stack.

The cooling pond system is unlined and mostly below-grade.³ The cooling pond system perimeter earthen dike impounds water above-grade along the easternmost 1,300 feet of the north wall and the northernmost 1,500 feet of the east wall. In 1992, the perimeter earthen dike was retrofitted within this section with a soil-bentonite cut-off wall, designated the North Cooling Pond Dike Cut-Off Wall (see Figure 1-4). The cut-off wall extends for a distance of 4,650 feet from the north end of the east cooling channel to the animal feed ingredients plant railroad tracks. The cut-off wall penetrates to depths of 70 to 90 feet through the dike fill, underlying foundation soils or cast overburden, and into the bedrock formation. The west end of the North Cooling Pond Dike Cut-Off Wall ties into the east end of the Plant Cut-Off Wall. The Plant Cut-Off Wall extends for a distance of 7,500 feet around the north, west and south sides of the plant site to just north of the northwest corner of the AHP (see Figure 1-4). The cut-off wall penetrates to depths of 65 to 85 feet through foundation soils or cast overburden and into the bedrock formation. The south wall of the cooling pond was retrofitted with an 8,100-foot-long soil-bentonite cut-off wall, designated the Expansion Area Cut-Off Wall (see Figure 1-4), in 1991. The cut-off wall penetrates through cast overburden and surficial soils, and into the bedrock formation, to depths of 95 to 115 feet below land surface.

A 0.2-acre sump, designated the northeast sump, previously existed at the toe of slope at the northeast corner of the cooling channel perimeter earthen dike. The sump area collected local seepage through the perimeter earthen dike and seepage from a gravel toe drain prior to installation of the North Cooling Pond Dike Cut-Off Wall. The gravel toe drain, designated the north toe drain (see Figure 1-4), was installed to a depth of 20 feet just beyond the toe of slope of the north wall perimeter earthen dike in 1990. Seepage collected in the toe drain previously discharged by gravity to the sump area. Seepage through the perimeter earthen dike had been

³ The unlined cooling pond was deemed environmentally protective under Appendix 7 of the Consent Decree among Mosaic Fertilizer, LLC, the U.S. Environmental Protection Agency and the Florida Department of Environmental Protection that became effective on August 6, 2016.

Mosaic Fertilizer, LLC
FDEP Construction/Operation Permit Application
New Wales Phase IV Gypsum Stack Extension
File Number: 21-13-0122

Section 1
Overview of New Wales
Stack System and Plan of Study
Page 1-11 of 30

curtailed by the cut-off wall. In addition to some remnant seepage, the sump area had been largely used to collect surface water runoff and rainfall recharge from its 3-acre watershed. A pump station maintained the sump water level elevations between 135.0 and 136.5 feet (NGVD) and transferred any excess water to the adjacent north cooling channel. The northeast sump was modified in 2017 to remove the 3-acre watershed from the gypsum stack system. The 0.2-acre sump area was filled and capped with a 60-mil HDPE liner with a 2-foot-thick protective soil cover. A drain was installed below the liner to collect seepage previously reporting to the sump. Seepage from the sump drain and the existing north toe drain is collected in a pump station and transferred to the adjacent north cooling channel. Clean rainfall runoff from the 3-acre watershed is routed into a drainage ditch that flows to George Allen Branch.

The cooling pond system has two siphon spillway structures located at the south end of the west cooling channel adjacent to the below-grade auxiliary holding pond (see Figure 1-4). Each structure contains four siphon spillways set at Elevation 155.3 feet (NGVD) that can each discharge 50 cfs under 0.2 feet of hydraulic head. Each structure has three 36-inch diameter HDPE pipes connecting it to the below-grade auxiliary holding pond.

Operation of the cooling pond system is covered under the industrial wastewater facility Permit FL0036421 for the New Wales Concentrates Plant. Changes to the cooling pond system are not planned or requested as part of this application.

1.2.2 South Gypsum Stack

The South Gypsum Stack is a lined stack. The HDPE liner covers a 704-acre base area within the upstream crest of the perimeter earthen dike. The design of the South Gypsum Stack includes the following key design features:

- A 60-mil high density polyethylene (HDPE) liner was installed over the base and upstream slope of the perimeter earthen dike. The Phase I gypsum stack expansion HDPE liner (which was completed prior to enactment of Chapter 62-673, F.A.C.) was overlain by a 24-inch-thick layer of compacted gypsum on approximately 40 percent of its surface with sedimented gypsum placed in slurry form over the remainder of the area. The Phase II gypsum stack expansion was constructed in accordance with the Chapter 62-673, F.A.C. (enacted in March 1993) and incorporated a 24-inch-thick layer of mechanically compacted gypsum having a saturated hydraulic conductivity equal to or less than 1.0×10^{-4} cm/sec placed on top of the HDPE liner.
- Three parallel rows of gravel drains, designated Drains A, B and C, were installed atop the HDPE liner below the projected slope of the gypsum stack. The gravel drains were installed to lower the hydraulic water pressure on the HDPE liner. The drain system outlets consist of 108 outlet pipes at 26 locations around the perimeter of the stack. The outlet locations are designated N1 to N7, E1 to E8, W1 to W7, EH, and WH on Figure 1-4. The drain system outlets convey water from the gravel drains to the seepage collection ditch surrounding the gypsum stack for return to the cooling pond.

Mosaic Fertilizer, LLC
FDEP Construction/Operation Permit Application
New Wales Phase IV Gypsum Stack Extension
File Number: 21-13-0122

Section 1
Overview of New Wales
Stack System and Plan of Study
Page 1-12 of 30

- Two containment dikes, designated the perimeter earthen dike and the internal gypsum dike, and two ditches, designated the seepage collection ditch and decant water/runoff collection ditch surround the stack. A toe road surrounds the perimeter earthen dike for inspection. The internal gypsum dike, upstream of the perimeter earthen dike, separates the seepage collection ditch from the decant water/runoff collection ditch.
- The seepage collection ditch is located between the perimeter earthen dike and internal gypsum dike. The ditch collects seepage from the drain system installed atop the liner and routes the flow of water to two flume structures located on the north wall of the stack for return to the cooling pond. The two reinforced concrete flume structures, designated the east flume and west flume, control the flow of water from the seepage collection and decant water/runoff collection ditches into the cooling pond. The decant water/runoff collection ditch surrounds the toe of slope of the active portions of the gypsum stack.⁴ The ditch collects decant water from the top of the stack and rainfall runoff from the stack slopes and routes the flow of water to the flume structures for return to the cooling pond.
- The relief drain, designated the north relief drain, was installed in the foundation beneath the liner and underlies the north perimeter of the Phase I portion of the South Gypsum Stack. The relief drain is used to control the groundwater level below the lined seepage collection ditch along the north wall of the stack. Five manholes, three fitted with pumps (i.e., MH-2, MH-7 and MH-9), are located along the 7,900-foot-long north relief drain alignment (see Figure 1-4). Water collected in the relief drain is pumped into the seepage collection ditch along the north wall of the stack.

1.2.3 Phase III East Extension

Construction and activation of the 121-acre lined Phase III East Extension area was completed in three phases.

- Construction of the 24-acre lined Area SG-1 portion within the 76-acre lined Phase III East-North Area was completed in May 2022. Area SG-1 was activated in September 2022.
- The remaining 52-acre portion of the Phase III East-North Area was completed in December 2022 and activated in January 2023.
- Construction of the 45-acre lined Phase III East-South Area was completed in May 2023, activated in August 2023.

The design of Phase III East Extension is similar to that for the South Gypsum Stack as described

⁴ The decant water/runoff collection ditch was removed at the toe of slope of the 55-acre early closure area at the northwest corner of the stack and reconstructed into a freshwater stormwater ditch. Flow in the decant water/runoff collection ditch on the west side of the stack is routed into the seepage collection ditch via a box culvert in the internal gypsum dike just south of the early closure area (see Figure 1-4).

Mosaic Fertilizer, LLC
FDEP Construction/Operation Permit Application
New Wales Phase IV Gypsum Stack Extension
File Number: 21-13-0122

Section 1
Overview of New Wales
Stack System and Plan of Study
Page 1-13 of 30

above in Section 1.2.2. A 60-mil textured HDPE liner with a 24-inch-thick layer of compacted gypsum cover will be installed over the base and slopes of the perimeter earthen dike. Three parallel rows of gravel drains, designated Drains A, B and C, were installed atop the HDPE liner below the projected slopes of the gypsum stack. The drain system has six outlets designated E9 through E14 on the south side of Phase III East and one outlet designated E15 on its west side. The drain system outlets convey water from the gravel drains to the seepage collection ditch that surrounds the gypsum stack for return to the cooling pond. Geonet-geocomposite vent strips are provided beneath the liner along the perimeter earthen dike crest, drains and drain outlets with vent pipe outlets on the perimeter earthen dike crest.

- Construction of the Phase III West-North Area, comprising a lined area of 30 acres, is scheduled for completion in December 2024.
- Construction of the Phase III West-South Area, comprising a lined area of 11 acres, has not yet been scheduled.

Two paleo-sink features (Area III-2 and Area 4) within the Phase III Extension area were stabilized as part of construction. In addition to the foundation improvements at Area III-2 and Area 4, the Phase III Extension design includes three monitoring or control features comprising the Subsurface Activity Early Detection System (SAEDS) required by the existing permit: (i) a foundation drainage system consisting of a continuous 3-foot thick permeable sand layer with embedded drainage pipes directly underlying the HDPE liner to control the hydraulic head below the liner and to reduce the hydraulic head difference across the upper confining unit; (ii) a piezometer monitoring system comprised of 112 piezometers installed below the foundation drainage system permeable sand layer to detect changes in water levels within the drainage system that could be indicative of the development of an erosion feature in the upper confining unit; and (iii) a passive seismic monitoring system.

1.2.4 Phase III West Extension

The Phase III West Extension is divided into north and south areas. Construction of the Phase III West-North Area, comprising a lined area of 30 acres, is scheduled for completion in December 2024. The design will incorporate the same features included in the Phase III East Extension. Construction of the Phase III West-South Area has not been scheduled.

1.2.5 Lined Auxiliary Holding Ponds

Two HDPE-lined auxiliary holding ponds (LESPs) were constructed atop the North Gypsum Stack in 2001 as part of closure of the stack (see Figure 1-4). The ponds are lined with a 60-mil HDPE liner and had an original combined total area including the perimeter containment dike crest of 69 acres. Process water can be pumped from the plant to the northwest corner of LESP-1 for storage when needed. LESP-2 receives water from LESP-1 after LESP-1 is full via the overflow spillway between LESP-1 and LESP-2. The perimeter containment dike crest and HDPE liner on the inside slope of the dike was raised and re-constructed to a uniform elevation of about 350 feet (NGVD) to restore 574 acre-feet of storage capacity that had been lost over time due to differential settlement of the top of the closed stack. Re-construction of the perimeter dikes and HDPE liner was initiated in August 2018 and completed in February 2019. Because of the outward movement

Mosaic Fertilizer, LLC
FDEP Construction/Operation Permit Application
New Wales Phase IV Gypsum Stack Extension
File Number: 21-13-0122

Section 1
Overview of New Wales
Stack System and Plan of Study
Page 1-14 of 30

of the perimeter dike crest required to raise the dikes, the total area including the crest of the perimeter containment dikes increased from 69 to 71 acres (with a corresponding reduction of the closed side slope area from 275 to 273 acres). A siphon line is used to transfer water from LESP-2 to the north cooling channel.

LESP-3 was constructed atop the Phase I West Area gypsum stack in 2005 and was activated in the same year. The pond was constructed with a 60-mil HDPE liner and occupied an area of 19 acres, including the crest of the perimeter containment dike. LESP-3 was incorporated into the Phase II West-North Area for gypsum stacking (see Figure 1-3). In preparation for construction of the Phase II West-North Area, the lower 25 feet of LESP-3 was filled with sedimented gypsum from June through August 2018. The upper 15 feet of the auxiliary holding pond continued to be use for water storage to January 2019. Removal of the remaining water in LESP-3 was initiated in January 2019 and completed at the end of March 2019.

Operation of LESP-1 and LESP-2 is included as part of industrial wastewater facility Permit FL0036421 for the New Wales facility. Additional changes to the LESP-2s are not planned or requested as part of this application.

1.2.6 Below-Grade Auxiliary Holding Pond

The 94-acre below-grade auxiliary holding pond (AHP) is used for process water storage. The AHP was activated in June 2003 and has remained in use since activation. Two siphon spillway structures located at the south end of the west cooling channel are used to transfer water from the cooling pond to the AHP. The AHP has minimum and maximum operating water elevations of 125 and 155 feet (NGVD), respectively, with a water storage capacity between the minimum and maximum operating water elevations of approximately 2,000 acre-feet. A floating pump is used to transfer water back to the cooling pond.

The AHP was retrofitted with a soil-bentonite cut-off wall, designated the AHP Cut-Off Wall Extension, in 2014. The soil-bentonite cut-off wall extends 4,100 feet along the west and south walls of the AHP (see Figure 1-4). The north end of the cut-off wall ties into the south end of the Plant Cut-Off Wall. The cut-off wall extends 940 feet east beyond the southeast corner of the AHP to the Expansion Area Cut-Off Wall at the southwest corner of the cooling pond to provide a long overlap between the two cut-off walls. The cut-off wall penetrates to depths of 55 to 85 feet and is keyed into the top of the underlying bedclay/bedrock formation.

Operation of the AHP is included as part of industrial wastewater facility permit FL0036421 for the New Wales facility. Changes to the AHP are not planned or requested as part of this application.

1.3 Closed North Gypsum Stack

The closed North Gypsum Stack is not part of the active gypsum stack system (excluding LESP-1 and LESP-2 on top of the stack). Stormwater runoff from the closed stack is routed to the freshwater pond located north of the gypsum stack system and subsequently pumped to Impoundment Area A-11. Seepage collected by side slope drains, which were installed as part of

Mosaic Fertilizer, LLC
FDEP Construction/Operation Permit Application
New Wales Phase IV Gypsum Stack Extension
File Number: 21-13-0122

Section 1
Overview of New Wales
Stack System and Plan of Study
Page 1-15 of 30

closure of the stack side slopes, drains into the cooling pond and cooling channels from 25 outlet locations (see Figure 1-4) around the perimeter of the stack.

The freshwater pond occupies an area of about 60 acres and abuts the north side of the north cooling channel (see Figure 1-4). Stormwater from the closed North Gypsum Stack is conveyed to the freshwater pond via a system of HDPE pipes, four 48-inch pipes from the toe ditch, three 42-inch pipes from the mid-slope ditch, one 18-inch pipe from the top gradient, and two 12-inch pipes from the LESP's (when the LESP's are not being used for process water storage). The water level in the freshwater pond is normally maintained at elevation of 142 feet (NGVD) and has a maximum operating elevation of 150 feet (NGVD). Stormwater within the freshwater pond is intermittently pumped to Impoundment Area A-11 by a pump station located in the southeast corner.

The closed North Gypsum Stack is operated and maintained in accordance with industrial wastewater facility permit FL0178527 for the New Wales facility. The existing permit became effective October 1, 2018 with an expiration date of September 30, 2023. A permit renewal application was submitted to the FDEP in a timely manner and pursuant to the provisions of Rule 62-620.335, Florida Administrative Code (F.A.C.); therefore, the existing permit is considered to be administratively continued. Mosaic received notification from the FDEP on May 2, 2023, that the renewal application has been determined to be complete. Changes to the closed North Gypsum Stack are not planned or required to accommodate the Phase IV Extension.

1.4 Performance of South Gypsum Stack and Phase III East Extension

Performance of the South Gypsum Stack (Phase I and Phase II) and the recently activated Phase III Extension is monitored by the following groundwater monitoring plan and Subsurface Activity Early Detection System (SAEDS) required by the existing permit.

- Groundwater Monitoring. Groundwater within aquifer systems near the South Gypsum Stack (Phase I and Phase II) and Phase III East Extension is monitored quarterly at the 31 wells listed below and shown on Figure 1-5). Five are background wells, eleven are observation wells in the Surficial Aquifer System installed near the perimeter of the gypsum stack, six are compliance wells in the upper portion (I1-zone) of the Intermediate Aquifer System installed near the perimeter of the gypsum stack, six are compliance wells in the Floridan Aquifer System (two F1-zone tapping the Suwannee Limestone and four F2-zone wells tapping the Avon Park Formation), one is an observation wells in the Floridan Aquifer System (F1-zone), and two are Floridan Aquifer System recovery wells tapping the Avon Park Formation.

Well	FDEP Well ID	Depth (feet)	Aquifer Monitored	Well Type
S-2	MWB-2	18	S	B
SA-5	MWB-3	108	I	B
NWC-3-I4	MWB-9	272	I	B
NWC-43-F1	MWB-46	346	F	B
NWC-44-F1	MWB-61	345	F	B

Mosaic Fertilizer, LLC
 FDEP Construction/Operation Permit Application
 New Wales Phase IV Gypsum Stack Extension
 File Number: 21-13-0122

Section 1
 Overview of New Wales
 Stack System and Plan of Study
 Page 1-16 of 30

Well	FDEP Well ID	Depth (feet)	Aquifer Monitored	Well Type
NWC-22-S1	MWI-4	36	S	O
NWC-23-S1	MWI-5	36	S	O
NWC-23-I1	MWC-6	74	I	C
NWC-24-S1	MWI-7	36	S	O
NWC-32-F2	MWC-14	751	F	C
NWC-33-F1	MWI-24	306	F	O
NWC-33-F2	MWC-47	850	F	C
NWC-34-S1	MWI-15	32	S	O
NWC-34-I1	MWC-16	92	I	C
NWC-35-S1	MWI-17	33	S	O
NWC-36-S1R	MWI-18R	38	S	O
NWC-36-I1R	MWC-19R	82	I	C
MWC-37-S1R	MWI-20R	42	S	O
NWC-38-S1R	MWI-21R	27	S	O
NWC-38-I1R	MWC-22R	90	I	C
NWC-39-S1	MWI-23	55	S	O
NWC-40-F2	MWC-43	919	F	C
NWC-41-F2	MWC-44	874	F	C
NWC-42-F1	MWC-45	315	F	C
NWC-45-F1	MWC-62	346	F	C
NWC-47-S1	MWI-55	30	S	O
NWC-47-I1	MWC-58	90	I	C
NWC-48-S1	MWI-56	43	S	O
NWC-48-I1	MWC-59	89	I	C
Recovery Well P4-B	MWC-P4B	832	F	C
Recovery Well P5	MWC-P5	825	F	C
Where: S= Surficial Aquifer System; I= Intermediate Aquifer System; F= Floridan Aquifer System; B= Background Well; O= Observation well; and C= Compliance well.				

- Passive Seismic Monitoring System. A Passive Seismic Monitoring System (PSMS), comprised of a seismic monitoring array with 40 stations, is installed around the perimeter of the South Gypsum Stack and Phase III Extension (see Figure 1-6). The PSMS is a component of the SAEDS required by the existing permit. At twelve of the stations (MSI-18 to MSI-22 and MSI-25 to MSI-31) the geophone array consists of two levels of 3-component geophone assemblies installed at elevations of 75 and 25 feet (NGVD) within the upper confining unit. At the newer 28 stations (MSI-41 through MSI-68), the geophone array has three levels of 3-component geophone assemblies installed at elevations of 60 and -40 feet (NGVD) in the upper confining unit at Elevation -140 feet (NGVD) in the upper part of the Suwannee Limestone.

Ten inactive stations (MSI-23, MSI-24 and MSI-32 to MSI-39) are located within the Phase III Extension. The geophone array at these stations consists of two levels of 3-component geophone assemblies installed at elevations of

Mosaic Fertilizer, LLC
FDEP Construction/Operation Permit Application
New Wales Phase IV Gypsum Stack Extension
File Number: 21-13-0122

Section 1
Overview of New Wales
Stack System and Plan of Study
Page 1-17 of 30

75 and 25 feet (NGVD) within the upper confining unit. The geophone cables were extended as part of Phase III construction and the stations can be reactivated.

- Foundation Drainage Layer Piezometer Monitoring System. A foundation piezometer monitoring system, comprised of 112 piezometers (see Figure 1-7), is included within the Phase III Extension foundation drainage layer system to detect changes in water level that could be indicative of the development of an erosion feature in the underlying foundation. The piezometer monitoring system is a component of the SAEDS required by the existing permit. The piezometers are typically located midway between drains at grid spacings of 250 feet by 250 feet or 150 feet by 250 feet. The water level in each piezometer is measured with a vibrating wire pressure transducer monitored via a data acquisition system. Initial monitoring of piezometers in Phase III East area began in September 2022 with the entire system of 88 piezometers monitored since June 2023. The 24 piezometers in Phase III West will be installed as part of construction.
- Stabilized Subsurface Feature Piezometer Monitoring Systems. The performance of the Area III-2 and Area 4 stabilized subsurface features in the Phase III Extension area are monitored with six and four piezometer monitoring stations, respectively (see Figure 1-8). Each Area 4 station includes one piezometer tapping cast overburden soils and two piezometers tapping the upper and lower portions of the upper confining unit in the Undifferentiated Arcadia Formation for a total of 12 piezometers. Four of the six stations in Area III-2 include one piezometer tapping cast overburden or backfilled soils and two piezometers tapping the upper and lower portions of the upper confining unit in the Undifferentiated Arcadia Formation, and two of the six stations have one piezometer installed just above the 100-mil high-density polyethylene geomembrane liner. The six stations contain a total of 14 piezometers.

1.4.1 Groundwater Monitoring

1.4.1.1 Surficial Aquifer System

Groundwater quality in the Surficial Aquifer System is monitored at six observation wells (22-S1, 23-S1, 24-S1, 34-S1, 35-S1 and 39-S1) at the perimeter of the Phase I and Phase II portions of the South Gypsum Stack and was previously monitored at three other locations (36-S1, 37-S1 and 38-S1) on the south wall of the stack prior to being relocated in CY2021 as part of construction of the Phase III Extension. Groundwater quality in the Surficial Aquifer System is monitored at five observation wells (36-S1R, 37-S1R, 38-S1R, 47-S1 and 48-S1) at the perimeter of the Phase III Extension.⁵

Groundwater quality at observation wells in the Phase I and Phase II portions of the South

⁵ Groundwater quality data from installation of the monitor wells through the third quarter of CY2023 are shown on Figures A-1 through A-24, Figures A-29 through A-32 and Figures A-37 through A-38 in Appendix A and tabulated in Tables B-1 through B-11, B-15, B-16 and B-19 in Appendix B.

Mosaic Fertilizer, LLC
 FDEP Construction/Operation Permit Application
 New Wales Phase IV Gypsum Stack Extension
 File Number: 21-13-0122

Section 1
 Overview of New Wales
 Stack System and Plan of Study
 Page 1-18 of 30

Gypsum Stack meet primary and secondary drinking water maximum contaminant levels (MCLs) for total dissolved solids, sulfate, sodium, fluoride and gross alpha particle activity, except for total dissolved solids and gross alpha particle activity at NWC-39-S1.⁶ Average constituent concentrations the six functioning and three former wells over the last year of quarterly sampling are shown in Table 1-1.⁷

Table 1-1. Groundwater Quality in South Gypsum Stack
 Surficial Aquifer System Monitor Wells

Monitor Well	Water Elevation (ft, NGVD)	pH	Total Dissolved Solids (mg/l)	Sulfate SO ₄ (mg/l)	Sodium Na (mg/l)	Fluoride F (mg/l)	Ortho-PO ₄ as P (mg/l)	Gross Alpha Particle Activity (pCi/l)
NWC-22-S1	145.8	6.23	232	<1.4	20.4	1.20	1.36	2.4
NWC-23-S1	145.8	6.92	399	1.8	16.6	1.62	0.43	3.1
NWC-24-S1	147.5	6.69	366	<1.4	18.7	0.93	0.52	3.4
NWC-34-S1	145.2	6.72	378	<1.4	17.0	0.81	0.20	2.3
NWC-35-S1	140.0	6.31	238	<1.4	20.0	1.38	1.21	2.7
NWC-36-S1	140.8	6.14	291	0.5	15.0	0.84	0.96	3.3
NWC-37-S1	134.2	6.29	460	46.4	35.1	0.40	0.82	7.3
NWC-38-S1	141.0	6.08	362	0.4	17.9	0.38	0.47	4.4
NWC-39-S1	133.7	6.01	673	239	36.9	0.81	0.44	18.3

The groundwater impact at monitor well NWC-39-S1 is associated with an isolated incident during initial operation of the Phase II East Area that allowed leakage of process water for several weeks through a hole in the liner created by a backhoe bucket at a location just northwest of monitor well NWC-39-S1. Constituent concentrations at NWC-39-S1 have decreased from peak total dissolved solids, sulfate and sodium concentrations of about 900, 400 and 50 mg/l, respectively, but have not yet returned to corresponding background concentrations of 300, 70 and 30 mg/l. Accordingly, based on up to 31 years of groundwater monitoring the liner system in the base of the South Gypsum Stack has largely functioned to protect the Surficial Aquifer System from groundwater impacts.

Average constituent concentrations over the last year of quarterly sampling are shown in Table 1-2 for the five observation wells in the Phase III Extension.

Table 1-2. Groundwater Quality in Phase III Gypsum Stack
 Surficial Aquifer System Monitor Wells

Monitor Well	Water Elevation (ft, NGVD)	pH	Total Dissolved Solids (mg/l)	Sulfate SO ₄ (mg/l)	Sodium Na (mg/l)	Fluoride F (mg/l)	Ortho-PO ₄ as P (mg/l)	Gross Alpha Particle Activity (pCi/l)
NWC-36-S1R	139.9	6.67	321	98	26.7	1.00	0.44	3.9
NWC-37-S1R	143.1	6.49	285	<1.4	28.6	0.28	0.14	2.5
NWC-38-S1R	140.6	5.95	450	222	44.1	0.47	1.85	3.7
NWC-47-S1	140.7	6.16	353	114	59.1	0.13	0.09	2.4
NWC-48-S1	138.1	6.61	471	91	43.2	1.01	0.83	2.9

⁶ Average combined radium 226 and radium 228 over the same period was 4.7 pCi/l.

⁷ Last year of quarterly sampling for functioning monitor wells, unless indicated otherwise, includes sampling events from Q3 2022 to Q3 2023.

Mosaic Fertilizer, LLC
 FDEP Construction/Operation Permit Application
 New Wales Phase IV Gypsum Stack Extension
 File Number: 21-13-0122

Section 1
 Overview of New Wales
 Stack System and Plan of Study
 Page 1-19 of 30

Groundwater quality at monitor wells meet primary and secondary drinking water MCLs for total dissolved solids, sulfate, sodium, fluoride and gross alpha particle activity. These wells have a shorter monitoring history than the Phase I and Phase II monitor wells as installation occurred in CY2021, sampling was initiated in the third quarter of CY2021, and the initial portion of the Phase III Extension was just activated in third quarter of CY2022.

Total dissolved solids, sulfate and sodium concentrations at the Phase III Extension wells are generally higher than at the Phase I and Phase II wells. The higher concentrations are attributed to recovery well P4 groundwater that was pumped into mine pits that previously existed within the Phase III Extension area. Recovery well P4 groundwater pumped into the mine pits had typical total dissolved solids, sulfate and sodium concentrations of 660, 220 and 40 mg/l.

1.4.1.2 Intermediate Aquifer System

Groundwater quality in the uppermost transmissive zone (I1-zone) of the Intermediate Aquifer System is monitored at two compliance wells (23-I1 and 34-I1) at the perimeter of the Phase I and Phase II portions of the South Gypsum Stack and was previously monitored at two other locations (36-I1 and 38-I1) on the south wall of the stack prior to being relocated in CY2021 as part of construction of the Phase III Extension. Groundwater quality in the I1-zone at the perimeter of the Phase III Extension is monitored at four compliance wells (36-I1R, 38-I1R, 47-I1 and 48-I1).⁸

Average constituent concentrations at the two functioning (Q3 2022 to Q3 2023 samples) and two former wells at the Phase I and Phase II portions of the South Gypsum Stack (CY2021 samples, wells were relocated after Q4 2021 as part of Phase III construction) are shown in Table 1-3. Measured parameters meet primary drinking water MCLs for sodium, fluoride and gross alpha particle activity and secondary drinking water MCLs for total dissolved solids and sulfate. The sulfate and sodium concentrations are relatively low, have remained stable without monotonic trends of increasing concentrations with time, and indicate that over the up to 31 years of groundwater monitoring the South Gypsum Stack has not caused groundwater impacts at monitor wells in the uppermost transmissive zone from either liner leakage, the 2004 anomaly or the 2016 WLI.

Table 1-3. Groundwater Quality in South Gypsum Stack
 Intermediate Aquifer System Monitor Wells

Monitor Well	Water Elevation (ft, NGVD)	pH	Total Dissolved Solids (mg/l)	Sulfate SO ₄ (mg/l)	Sodium Na (mg/l)	Fluoride F (mg/l)	Ortho-PO ₄ as P (mg/l)	Gross Alpha Particle Activity (pCi/l)
NWC-23-I1	144.3	7.39	248	1.6	16.9	1.02	0.06	2.7
NWC-34-I1	126.9	7.73	215	2.9	14.1	0.54	0.03	2.9
NWC-36-I1	140.9	7.32	212	1.4	7.3	0.26	0.06	2.8
NWC-38-I1	138.9	7.04	241	0.4	6.6	0.40	0.06	3.2

⁸ Groundwater quality data from installation of the monitor wells through the third quarter of 2023 are shown on Figures A-39 through A-50 and Figures A-55 through A-60 in Appendix A, and tabulated in Tables B-20 through B-25 and Tables B-28 through B-30 in Appendix B.

Mosaic Fertilizer, LLC
 FDEP Construction/Operation Permit Application
 New Wales Phase IV Gypsum Stack Extension
 File Number: 21-13-0122

Section 1
 Overview of New Wales
 Stack System and Plan of Study
 Page 1-20 of 30

Average constituent concentrations in the I1-zone compliance wells around the perimeter of the Phase III Extension over the last year of quarterly sampling are shown in Table 1-4.

Table 1-4. Groundwater Quality in Phase III Gypsum Stack
 Intermediate Aquifer System Monitor Wells

Monitor Well	Water Elevation (ft, NGVD)	pH	Total Dissolved Solids (mg/l)	Sulfate SO ₄ (mg/l)	Sodium Na (mg/l)	Fluoride F (mg/l)	Ortho-PO ₄ as P (mg/l)	Gross Alpha Particle Activity (pCi/l)
NWC-36-I1R	137.4	6.88	132	0.4	9.2	0.80	0.37	1.2
NWC-38-I1R	129.2	8.50	180	27.4	22.7	0.88	<0.03	2.7
NWC-47-I1	139.2	6.62	161	1.6	6.5	0.57	0.91	2.0
NWC-48-I1	138.8	7.30	208	1.7	9.6	0.78	0.33	2.2

Measured parameters meet primary drinking water MCLs for sodium, fluoride and gross alpha particle activity and secondary drinking water MCLs for total dissolved solids and sulfate.⁹ These wells have a shorter monitoring history than the Phase I and Phase II monitor wells as installation occurred in CY2021, sampling was initiated in the third quarter of CY2021, and the initial portion of the Phase III Extension was just activated in the third quarter of CY2022.

1.4.1.3 Floridan Aquifer System

Groundwater quality in the Upper Floridan Aquifer portion of the Floridan Aquifer System is monitored at three wells tapping the upper permeable zone in the Suwannee Limestone and four wells tapping the lower permeable zone in the Avon Park Formation. Groundwater monitoring in the upper permeable zone (F1-zone) in the Suwannee Limestone is undertaken at observation well NWC-33-F1 located about 300 feet west of the South Gypsum Stack, and compliance wells NWC-42-F1 located 800 feet west of the southwest corner of the South Gypsum Stack and NWC-45-F1 located 2,000 feet southwest of the Phase III Extension. Groundwater quality in the lower permeable zone (F2-zone) in the Avon Park Formation is monitored at compliance wells NWC-32-F2, NWC-33-F2, NWC-40-F2 and NWC-41-F2. Groundwater quality in the lower permeable zone is also monitored at recovery well P4-B and stand-by recovery well P-5 when operated.¹⁰

Upper Permeable Zone in Suwannee Limestone: Groundwater impacts in the upper permeable zone of the Upper Floridan aquifer, if occurring, would be expected to be from either the 2004 anomaly or 2016 WLI because of the depth of the monitor wells, and not from incidental leaks in the liner system. Average constituent concentrations at the three monitor wells over the last year of quarterly sampling are shown in Table 1-5. Background concentrations at two monitor wells located approximately 1,900 feet upgradient of the South Gypsum Stack and 1,000 feet upgradient of the Phase III Extension (see Figure 1-5) are included for comparison.

⁹ The pH, and sulfate and sodium concentrations at monitor well NWC-38-I1R are suspect and likely a result of an issue with the neat cement grout seal placed above the collection zone. The well will be re-developed to restore ambient groundwater conditions or replaced if needed.

¹⁰ Groundwater quality data from installation of the monitor wells through the third quarter of CY2023 are shown on Figures A-113 through A-114 in Appendix A, and tabulated in Tables B-57 through B-58 in Appendix B.

Mosaic Fertilizer, LLC
 FDEP Construction/Operation Permit Application
 New Wales Phase IV Gypsum Stack Extension
 File Number: 21-13-0122

Section 1
 Overview of New Wales
 Stack System and Plan of Study
 Page 1-21 of 30

Table 1-5. Groundwater Quality in Upper Permeable Zone of Upper Floridan Aquifer

Monitor Well	Water Elevation (ft, NGVD)	pH	Total Dissolved Solids (mg/l)	Sulfate SO ₄ (mg/l)	Sodium Na (mg/l)	Fluoride F (mg/l)	Ortho-PO ₄ as P (mg/l)	Gross Alpha Particle Activity (pCi/l)
Background								
NWC-43-F1	67.2	7.58	----	36.3	5.9	0.32	0.03	2.0
NWC-44-F1	65.4	7.78	----	23.3	9.0	0.42	0.04	1.9
NWC-33-F1	59.8	7.59	243	5.9	18.4	0.77	0.05	<2.5
NWC-42-F1	59.3	7.32	----	20.6	15.6	0.30	0.05	2.0
NWC-45-F1	60.4	7.68	----	27.1	8.2	0.35	0.05	1.6

Groundwater quality at observation well NWC-33-F1 and compliance well NWC-42-F1 downgradient of the South Gypsum Stack meets primary drinking water MCLs for sodium, fluoride and gross alpha particle activity and secondary drinking water MCL for sulfate. The sulfate and sodium concentrations are relatively low, have remained stable without monotonic trends of increasing concentrations with time over the 19- and 7-year monitoring periods of the wells, respectively, and indicate that the South Gypsum Stack has not caused groundwater impacts at the monitor wells from either liner leakage, the 2004 anomaly or the 2016 WLI.

Groundwater quality at compliance well NWC-45-F1 southwest of the Phase III Extension is consistent with background concentrations. The well has a shorter monitoring history of 4 years and is located too far south to monitor groundwater flowing within the Upper Floridan Aquifer below the South Gypsum Stack and Phase III Extension. It is positioned for monitoring the Phase IV Extension.

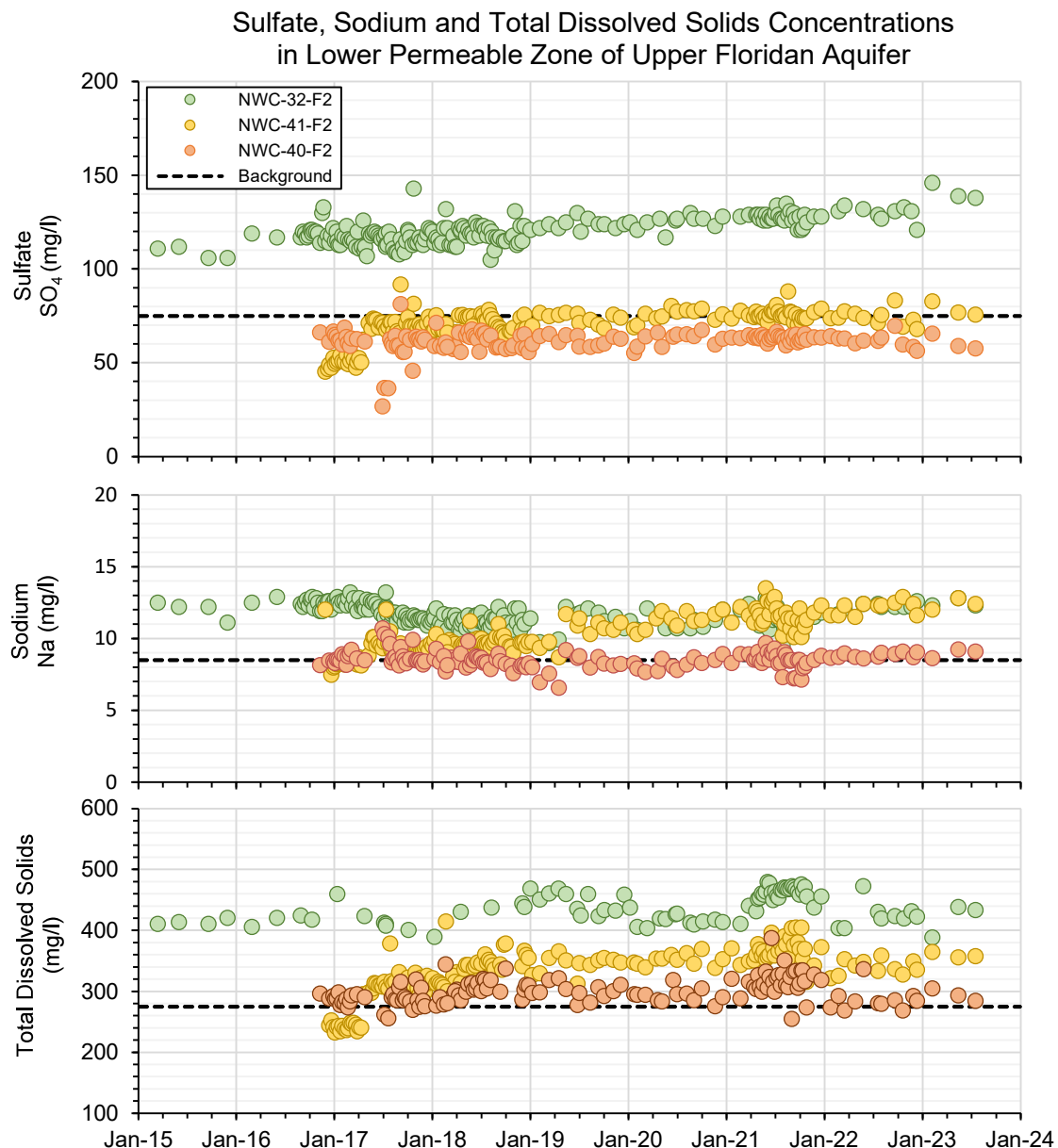
Lower Permeable Zone in Avon Park Formation: Groundwater impacts in the lower permeable zone of the Upper Floridan aquifer, if occurring, would be expected to be from either the 2004 anomaly or 2016 WLI because of the depth of the monitor wells, and not from incidental leaks in the liner system. Average constituent concentrations at the three compliance monitor wells over the last year of quarterly sampling are shown in Table 1-6. Background concentrations are shown for comparison. Total dissolved solids, sulfate and sodium concentrations are also plotted versus time below.

Table 1-6. Groundwater Quality in Lower Permeable Zone of Upper Floridan Aquifer

Monitor Well	Water Elevation (ft, NGVD)	pH	Total Dissolved Solids (mg/l)	Sulfate SO ₄ (mg/l)	Sodium Na (mg/l)	Fluoride F (mg/l)	Ortho-PO ₄ as P (mg/l)	Gross Alpha Particle Activity (pCi/l)
Background	----	7.60	275	75	8.5	0.50	0.02	3.0
NWC-40-F2	56.68	7.53	286	61	8.9	0.23	0.04	2.9
NWC-41-F2	57.86	7.50	347	75	12.4	0.26	0.18	2.3
NWC-32-F2	57.65	7.52	424	133	12.4	0.27	0.08	2.1

Mosaic Fertilizer, LLC
 FDEP Construction/Operation Permit Application
 New Wales Phase IV Gypsum Stack Extension
 File Number: 21-13-0122

Section 1
 Overview of New Wales
 Stack System and Plan of Study
 Page 1-22 of 30



Constituent concentrations at wells NWC-32-F2, NWC-40-F2 and NWC-41-F2 remain below primary drinking water MCLs for sodium, fluoride and gross alpha particle activity, and below secondary drinking water MCLs for total dissolved solids and sulfate.

Peak changes in constituent concentrations from groundwater impacts associated with the 2016 WLI in the Phase II West Area at wells NWC-32-F2, NWC-40-F2 and NWC-41-F2 of about 1.0, 0.6 and <0.1 percent of the attenuated source concentrations were predicted for CY2023, respectively, corresponding to about 115, 70 and 12 mg/l total dissolved solids and about 35, 22 and 4 mg/l sulfate. Although changes in constituent concentrations are greater at NWC-41-F2 than at NWC-40-F2, the changes in constituent concentrations at the three wells are consistent

Mosaic Fertilizer, LLC
 FDEP Construction/Operation Permit Application
 New Wales Phase IV Gypsum Stack Extension
 File Number: 21-13-0122

Section 1
 Overview of New Wales
 Stack System and Plan of Study
 Page 1-23 of 30

with or less than predicted. Deviations between predicted and measured constituent concentrations can result from local differences in aquifer transmissivity and dispersivity than conditions assumed in the groundwater model.

Recovery Wells: Recovery well P4-B was activated in February 2017. The zone of capture for the recovery well encompasses the South Gypsum Stack and the foot-print of the Phase III Extension (see Figure 1-9). The operating protocol for recovery well P4-B establishes a minimum monthly average pumping rate of 3,500 gal/min to maintain the zone of capture and recover groundwater from the repaired 2016 sinkhole in the South Gypsum Stack. Recovery well P5 is maintained as a standby recovery well. The operating protocol for recovery well P5 requires sampling water quality quarterly for pH, specific conductance, total dissolved solids, sulfate, sodium and orthophosphate. During each sampling event, P5 is pumped at a minimum rate of 2,000 gal/min for a period of 7 days and sampled daily. It is not required to be activated as a recovery well unless the following groundwater quality criteria are met:

- specific conductance exceeds 1,150 $\mu\text{mhos/cm}$ and exhibits continually an increasing trend over time;
- the sulfate concentration exceeds 240 mg/l and exhibits continually an increasing trend over time; or
- the sodium concentration exceeds 30 mg/l and exhibits continually an increasing trend over time.

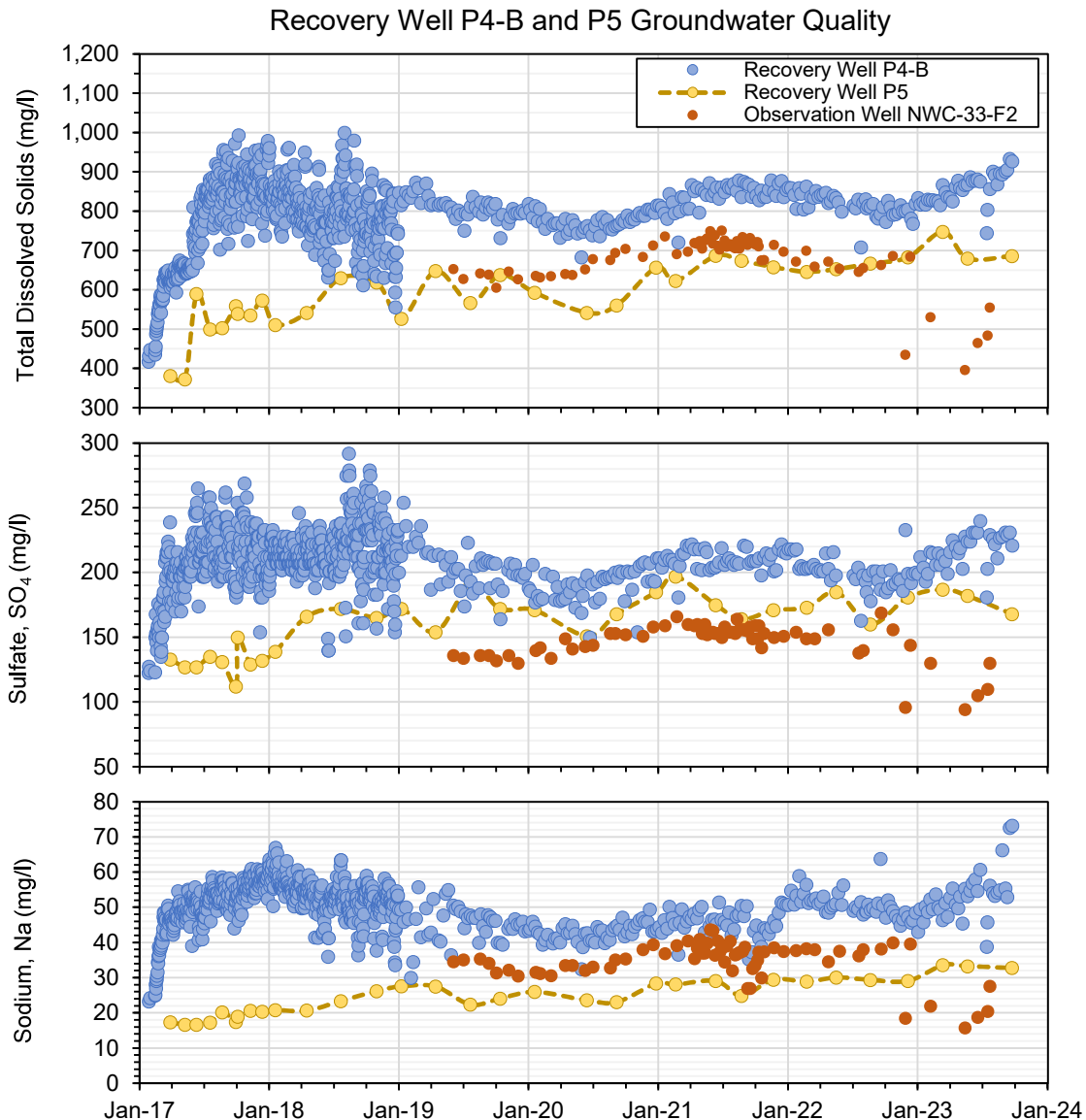
Constituent concentrations at the two recovery wells and observation well NWC-33-F2, located between the South Gypsum Stack and recovery well P4-B, are shown in Table 1-7. Background concentrations are shown for comparison. Total dissolved solids, sulfate and sodium concentrations are plotted versus time below.

Table 1-7. Groundwater Quality in Lower Permeable Zone of Upper Floridan Aquifer

Well	pH	Specific Conductance ($\mu\text{mhos/cm}$)	Total Dissolved Solids (mg/l)	Sulfate SO_4 (mg/l)	Sodium Na (mg/l)	Fluoride F (mg/l)	Ortho- PO_4 as P (mg/l)	Gross Alpha Particle Activity (pCi/l)
Background	7.60	410	275	75	8.5	0.50	0.02	3.0
Observation Well NWC-33-F2	7.10	840	490	115	20.9	1.70	0.48	2.0
Recovery Well P4-B	6.61	1,360	866	220	54.1	---	3.32	4.6
Recovery Well P5	6.77	1,050	705	180	33.2	---	1.83	---
1. Recovery well P5 concentrations are from March, May and September 2023 selected peak concentrations at the end of each 7-day pumping event. 2. Recovery well P4-B concentrations are averages from weekly samples over the same period as the P5 pumping events. 3. Observation Well NWC-33-F2 concentrations from five samples over a similar period as the P5 pumping events.								

Mosaic Fertilizer, LLC
 FDEP Construction/Operation Permit Application
 New Wales Phase IV Gypsum Stack Extension
 File Number: 21-13-0122

Section 1
 Overview of New Wales
 Stack System and Plan of Study
 Page 1-24 of 30



The increase in recovery well P4-B constituent concentrations from mid-2020 through mid-2021 could be attributed to the subsequently detected breach in the HDPE liner in the Phase II East Area of the South Gypsum Stack at AOI2. A period of generally decreasing dissolved solids and sulfate concentrations then followed through the end of CY2022 which coincided with stabilization grouting activities at AOI2. Constituent concentrations at recovery well P4-B began to increase again in early-CY2023. Constituent concentrations at recovery well P4-B still remain below the primary drinking water MCLs for sodium and gross alpha particle activity. Sulfate concentrations also continue to remain below the secondary drinking water MCL.

The current groundwater flow and transport model utilized for the South Gypsum Stack was last modified in CY2017 and calibrated to groundwater quality data from recovery wells P4 and P5. Since construction of the model, an additional six-years of groundwater monitoring has occurred,

Mosaic Fertilizer, LLC
FDEP Construction/Operation Permit Application
New Wales Phase IV Gypsum Stack Extension
File Number: 21-13-0122

Section 1
Overview of New Wales
Stack System and Plan of Study
Page 1-25 of 30

recovery well P4-B was installed and operated continuously, and AOI2 and AOI4 have been identified. Modification and recalibration of the flow and transport model is underway to incorporate additional groundwater monitoring data from the recovery and monitor wells and leakage from AOI2 and AOI4.

Observation well NWC-33-F2 was installed between the South Gypsum Stack and recovery well P4-B. It was expected that constituent concentrations would be higher at NWC-33-F2 than at the recovery well because the well is located closer to stack. The consistently lower constituent concentrations at well NWC-33-F2 indicate that the monitor well collection zone, while installed to the same depth as recovery well P4-B, may not tap the same cavernous zone within the Upper Floridan Aquifer. Constituent concentrations at well NWC-33-F2, however, are higher than observed at wells NWC-32-F2, NWC-40-F2 and NWC-41-F2 indicating that groundwater impacts associated with the 2016 WLI in the Phase II West Area are being detected at the well. Constituent concentrations at well NWC-33-F2 remain below the primary MCLs for sodium and gross alpha particle activity and remain below the secondary MCL for sulfate. Fluoride concentrations at the well previously averaged 4.2 mg/l, slightly above the primary MCL of 4.0 mg/l, but have declined to below 2.0 mg/l.

Constituent concentrations are trending higher with time at recovery well P-5, which likely reflects the dispersed front of the impacted groundwater being recovered at P4-B. Specific conductance and sulfate concentrations remain below the threshold concentrations of 1,150 $\mu\text{mhos/cm}$ and 240 mg/l that trigger operation of P5 as a recovery well at concentrations of 1,050 $\mu\text{mhos/cm}$ and 180 mg/l. Sodium concentrations exceeded the threshold concentration of 30 mg/l during the March, May and September 2023 pumping events with concentrations averaging 33.2 mg/l. Additional quarterly pumping events will be evaluated to determine if the trend over time above 30 mg/l continues before activation of recovery well P5. Recalibration of the flow and transport model that may also yield a revised sodium threshold concentration for activation.

1.4.2 Passive Seismic Monitoring

During the 43-month monitoring period from the inception of the Passive Seismic Monitoring System in June 2020 through December 2023, a total of 1,502 SAEs have been identified. Most of the SAEs (1,498 out of 1,502) were spatially located in the South Gypsum Stack. Two SAEs were identified in the Phase III Extension. The remaining two SAEs were located outside of the area encompassing the South Gypsum Stack and Phase III Extension.

Based on the spatial distribution, recurrence, and energies of the SAEs, four Areas of Interest (AOI) were previously identified: three within or near the east compartment of the Phase II portion of the stack (AOI1, AOI2 and AOI3); and one near the Phase II-West North Area (AOI4).

- The exploration in AOI1 indicated the absence of a breach in the liner system or a void above the liner. On-going piezometric water level monitoring in piezometers installed in gypsum above the liner, in cast overburden soils underlying the liner, and in the upper portion of the Undifferentiated Arcadia Formation continue to indicate the absence of a breach in the liner system or anomalous subsurface conditions.

Mosaic Fertilizer, LLC
FDEP Construction/Operation Permit Application
New Wales Phase IV Gypsum Stack Extension
File Number: 21-13-0122

Section 1
Overview of New Wales
Stack System and Plan of Study
Page 1-26 of 30

- Exploratory borings in AOI2 indicated that a cavity existed in gypsum at the base of the stack and that the HDPE liner was breached. Stabilization grouting, consisting of the bulk filling of the cavity in the base of the stack with concrete grout, was initiated in July 2022 and completed in November 2022. Pressure grouting of the foundation soils and Intermediate Aquifer System upper confining unit was initiated in January 2023 with completion expected in February 2024. Post-repair performance monitoring of the grouted cavity will be undertaken with piezometers to measure water levels in the gypsum stack, in cast overburden soils underlying the liner, and in the Undifferentiated Arcadia Formation within the upper confining unit. Closure of the top of the South Gypsum Stack at AOI2 will be undertaken in accordance with a closure plan approved by the Department.
- The exploration in AOI3 indicated the absence of a breach in the liner system or a void above the liner. On-going piezometric water level monitoring in piezometers installed in gypsum above the liner continue to indicate the absence of a breach in the liner system. A microgravity survey will be performed to further check for a detectable cavity in gypsum at the base of the stack. Closure of the top of the South Gypsum Stack in the vicinity of AOI3 will be undertaken in conjunction with closure of the area containing AOI2.
- An initial subsurface exploration program consisting of vertical and inclined core borings and installation of vibrating wire piezometers and a stability monitoring instrument was completed at AOI4 in July 2023. The second phase of the exploration program was started in November 2023. In December 2023 one of second phase inclined core holes encountered a complete loss of drilling fluid circulation and cavity confirming a breach in the HDPE liner at the base of the gypsum stack caused by an anomaly in the underlying foundation. A letter confirming a critical condition at AOI4 was submitted to the Department on December 14, 2023. The subsurface exploration program intended to estimate the size and characteristics of the anomaly (to develop a CAGP for the Department's review) is in-progress.

Only two SAEs have been detected in the Phase III Extension. The SAEs occurred in December 2020 and February 2021 in the Floridan Aquifer System at respective depths of 540 and 520 feet below the base of the stack. The SAEs had low energies of 171 and 223 joules corresponding to 8 and 11 percent of the 2,000 joules energy considered a potential indicator of subsurface activity. SAEs have not been detected in the Phase III Extension since its activation in September 2022.

1.4.3 Foundation Drainage Layer Piezometer Monitoring

Monitoring of the 88 foundation drainage layer piezometers in East Area of the Phase III Extension began in June 2023. Water levels within the sand drainage layer are variable and are not yet at equilibrium because of on-going adjacent construction activities in the Phase III West Area. Additional deairing of some of the piezometer pipes between the vibrating wire sensors and

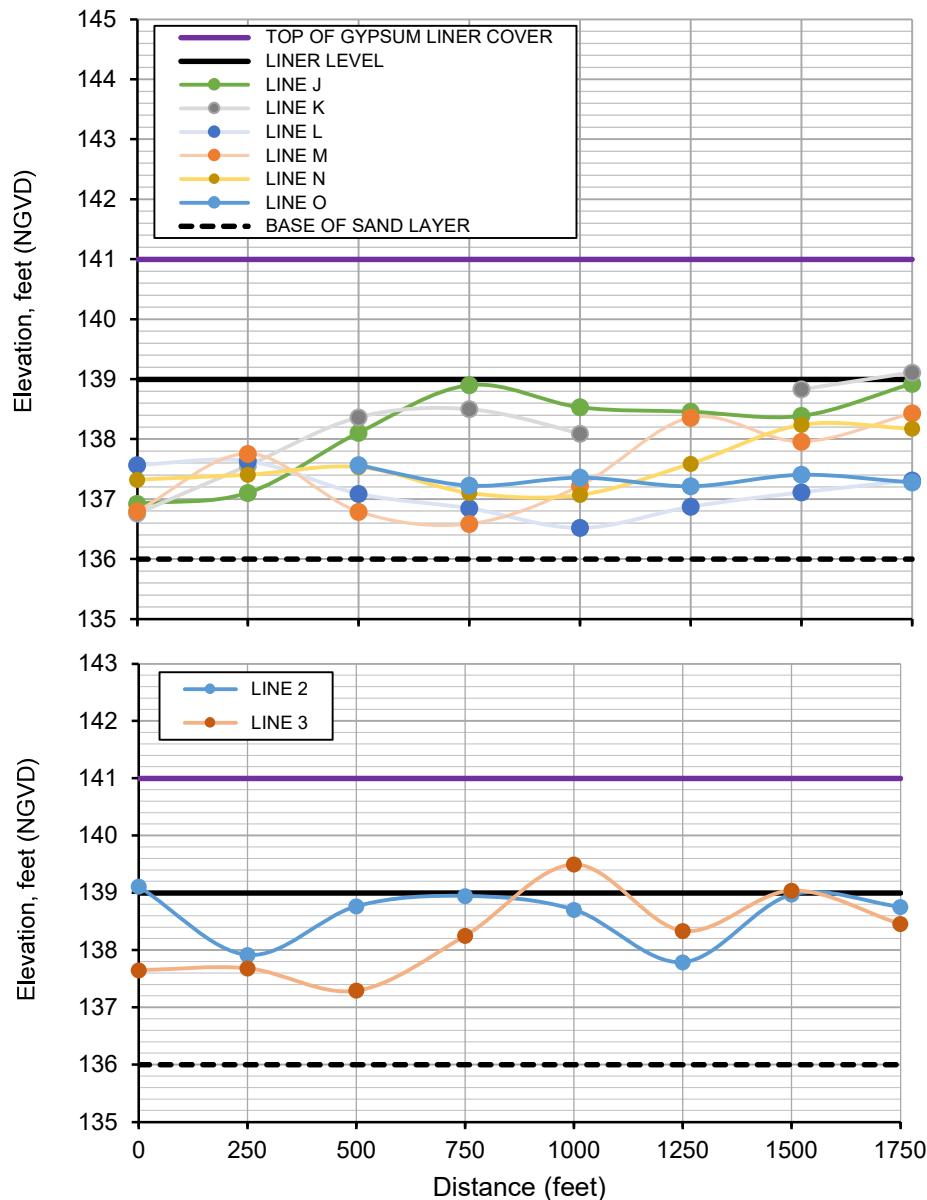
Mosaic Fertilizer, LLC
 FDEP Construction/Operation Permit Application
 New Wales Phase IV Gypsum Stack Extension
 File Number: 21-13-0122

Section 1
 Overview of New Wales
 Stack System and Plan of Study
 Page 1-27 of 30

piezometer collection zones at the base of foundation drainage layer will likely be undertaken once nearby construction activity is complete.

Measured piezometric water levels in September 2023 are presented below. Line J through Line O represent areas which are located in the 97-acre lined Phase III East-North and Phase III East-South areas (see Section 1.2.3) and Lines 2 and 3 represent areas which are located in the 24-acre lined Area SG-1 portion of the Phase III East-North Area. Piezometric water elevations are typically between 137 and 139 feet (NGVD) which is consistent with the target range of 136 to 138 feet (NGVD) that the drainage layer will be operated within once in equilibrium.

Piezometric Water Elevations in Foundation Drainage Layer



Mosaic Fertilizer, LLC
FDEP Construction/Operation Permit Application
New Wales Phase IV Gypsum Stack Extension
File Number: 21-13-0122

Section 1
Overview of New Wales
Stack System and Plan of Study
Page 1-28 of 30

1.4.4 Stabilized Paleo-Sink Feature Piezometer Monitoring

Vibrating wire piezometers were installed at four stations in Area 4 and six stations in Area III-2 to monitor piezometric water elevations and allow Mosaic to respond appropriately to changes in performance of the stabilized areas. Piezometric water levels are read and recorded at 4-hour intervals via an automated data acquisition system. Monitoring has been underway since August 2022 at the Area 4 stations and since February 2023 at the Area III-2 stations. Performance to-date at both areas is satisfactory.

1.4.5 Findings of Performance Monitoring

Findings from ongoing performance monitoring at the South Gypsum Stack and Phase III Extension indicate that:

- groundwater impacts from prior subsurface anomalies in the South Gypsum Stack occur in the lower permeable zone of the Upper Floridan Aquifer, are contained on Mosaic property and captured with recovery wells;
- groundwater monitoring at the I1-zone compliance monitor wells in the uppermost transmissive zone of the Intermediate Aquifer System and at F1-zone compliance monitor wells in the upper permeable zone of the Upper Floridan Aquifer indicate that impacts from either liner leakage, the 2004 anomaly, the 2016 WLI, AOI-2 or AOI4 have not occurred;
- the passive seismic monitoring system has demonstrated the ability to function as an early detection system for subsurface activity and will be expanded to encompass the Phase IV Extension;
- the foundation drainage system piezometric water level monitoring system is functioning satisfactorily, and a similar system will be incorporated into the Phase IV Extension; and
- repair of foundation features can be successfully performed prior to liner installation to restore the integrity of the Intermediate Aquifer System upper confining unit and similar remediation will be implemented in the Phase IV Extension if foundation anomalies are identified.

1.5 **Plan of Study for Preparation of FDEP Phase IV Permit Application**

Ardaman & Associates, Inc. was retained by Mosaic Fertilizer, LLC to provide engineering services to design the Phase IV Extension for the New Wales facility and to develop supporting documentation for the associated FDEP construction/operation permit application. Specifically, the plan of study included the following items.

- Review of: (i) previous engineering studies of the New Wales gypsum stack system and performance monitoring data from the South Gypsum Stack and Phase III Extension relevant to the design of the Phase IV Extension; (ii) prospect borings performed by Mosaic for stratigraphic information relevant to

Mosaic Fertilizer, LLC
FDEP Construction/Operation Permit Application
New Wales Phase IV Gypsum Stack Extension
File Number: 21-13-0122

Section 1
Overview of New Wales
Stack System and Plan of Study
Page 1-29 of 30

determining depths to the top of the upper confining unit; and (iii) well installation and abandonment records to identify wells within the extension area that have not been properly abandoned.

- A geotechnical field exploration program within the Phase IV Extension that included performance of Standard Penetration Test borings along the perimeter and within the interior of the site, Cone Penetration Tests to investigate the extent and thickness of soft phosphatic clays that were deposited within prior mine pits at the site, and undisturbed sampling of soils at selected boring locations.
- Investigation of selected locations of prior topographic depressions along and at the intersections of photolinears identified on historical aerial photography and 7.5-minute USGS quadrangle maps with Standard Penetration Test borings and piezometer installations to determine whether the topographic depressions were associated with a geologic feature within the upper confining unit that could potentially result in the formation of a sinkhole.
- Microgravity and seismic reflection tomography geophysical surveys for detection of geologic features within the upper confining unit that could potentially result in the formation of a sinkhole.
- A geotechnical laboratory testing program on representative natural ground and cast overburden soils to characterize the index, strength, permeability and deformation characteristics of soils relevant to the design of the Phase IV Extension.
- Geotechnical evaluation of the site in accordance with Rule 62-673.320(3)(k) addressing soil stratigraphy, engineering properties of in situ soils, engineering properties of New Wales gypsum, and engineering properties of earthen construction materials relevant to the design and construction of the Phase IV Extension.
- Hydrological evaluation of the site in accordance with Rule 62-673.320(3)(j) addressing: (i) surface hydrology; (ii) hydrogeology of the Surficial, Intermediate and Floridan Aquifer Systems and groundwater quality within the aquifer systems; and (iii) geology relevant to evaluation of sinkhole potential.
- Design and preparation of schematic drawings and technical specifications for construction of the Phase IV Extension: (i) perimeter earthen containment dikes; (ii) inverted composite HDPE-compacted gypsum liner system; (iii) drain system above the liner for lowering porewater pressures along the liner below the stack side slopes; (iv) decant water/stormwater runoff drainage ditch system and hydraulic structures; and (v) freshwater stormwater drainage ditch system and hydraulic structures.
- Design and preparation of schematic drawings and technical specifications for: (i) construction of a foundation drainage system consisting of a continuous permeable sand layer with embedded drainage pipes directly underlying the

Mosaic Fertilizer, LLC
FDEP Construction/Operation Permit Application
New Wales Phase IV Gypsum Stack Extension
File Number: 21-13-0122

Section 1
Overview of New Wales
Stack System and Plan of Study
Page 1-30 of 30

HDPE liner to control the hydraulic head below the liner and to reduce the hydraulic head difference across the upper confining unit; (ii) a piezometer monitoring system within the foundation drainage system to detect changes in water levels within the drainage system that could be indicative of the development of an erosion feature in the upper confining unit; (iii) a soil-bentonite cut-off wall surrounding the foundation drainage system to contain and control the water level within the permeable sand layer; (iv) excavation or stabilization of soft clays sediments or phosphatic clays present in valleys between spoil piles located in the northeast area; (v) excavation and abandonment of prior sealing water wells KS-2 and MM-4; (vi) excavation and removal of foundations and demolition debris within the limits of the former Kingsford plant; and (vii) groundwater recharge ditches around portions of the perimeter of the south and east boundaries of the Phase IV Extension area to maintain groundwater flow in the Surficial Aquifer System to abutting and nearby wetlands.

- Modifications of the groundwater monitoring plan to: (i) abandon existing Surficial and Intermediate (I1-zone) Aquifer System monitor wells along the south side of the Phase III Extension to accommodate construction of the Phase IV Extension; (ii) incorporate additional Surficial and Intermediate (I1-zone) Aquifer System monitor wells around the perimeter of the Phase IV Extension on the perimeter earthen dike toe road to provide a spacing between monitor well clusters of about 1,500 feet; and (iii) install a monitor well within the lower permeable zone of the Upper Floridan Aquifer System (F2-zone) immediately west of the Phase IV Extension.
- Selection of a design slope to safely raise the gypsum stack atop the liner to a design water elevation within the settling compartments atop the stack of 470 feet (NGVD).
- Preparation of revisions to the New Wales gypsum stack system operation plan as needed to incorporate the Phase IV Extension.
- Preparation of the FDEP construction/operation permit application and engineering report in support of the application (NPDES Permit FL0036421).

Section 2 of the report presents facility and area information. Section 3 describes key features of the Phase IV Extension and addresses compliance of the basic design with the requirements in Chapter 62-673, F.A.C. Hydrogeologic and geotechnical evaluations, including results of the geotechnical and geophysical field exploration programs and laboratory testing programs, are presented in Sections 4, 5 and 6, respectively. Design and construction recommendations, including seepage and slope stability analyses and stormwater conveyance, are provided in Section 7. Operation guidelines and a revised groundwater monitoring plan are included in Section 8. Section 9 addresses a conceptual closure plan for the combined South Gypsum Stack and Phase III and Phase IV Extensions for conditions at the end of life of the Phase IV Extension. Technical construction specifications are included in Section 10.

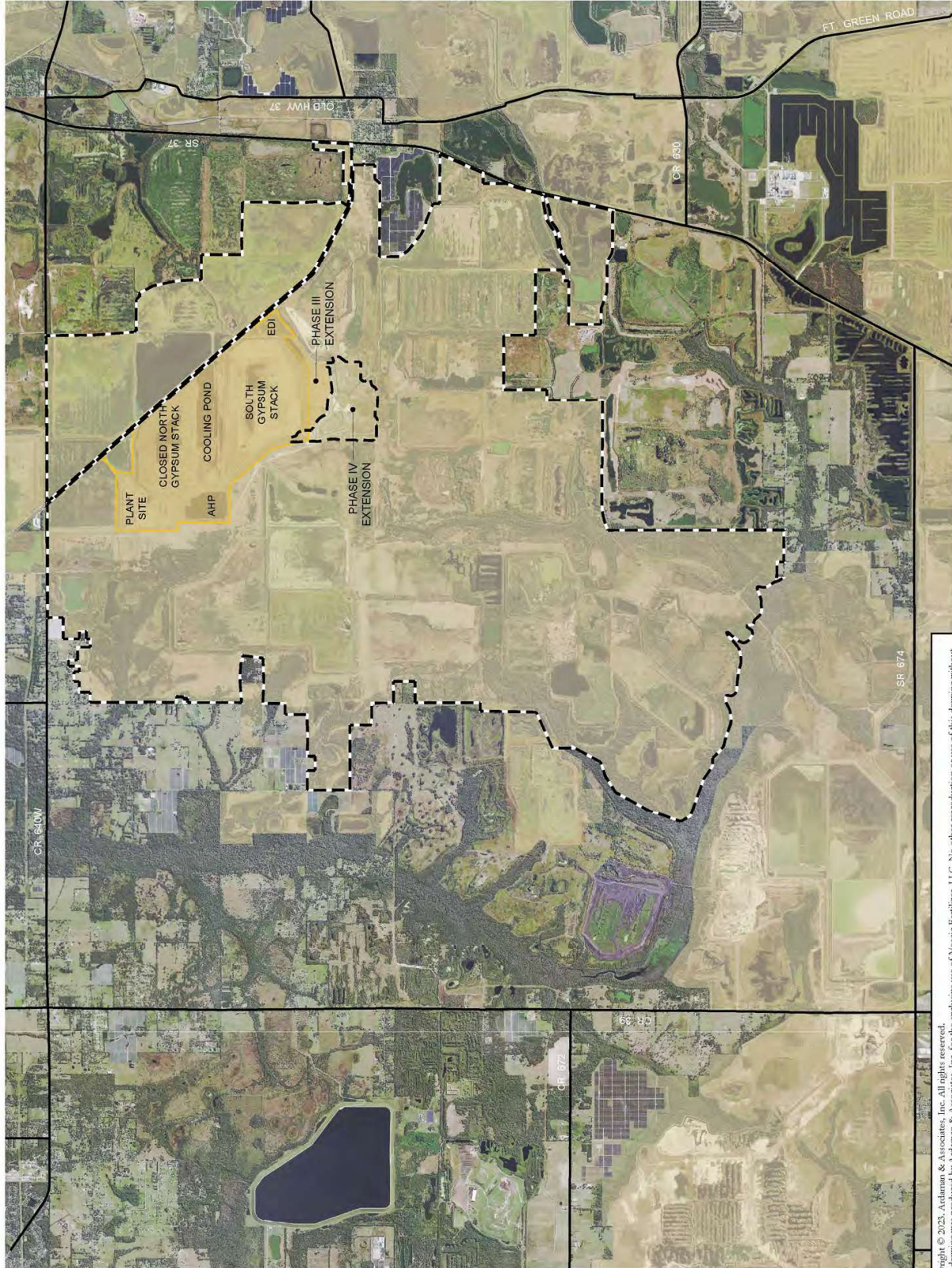


0 3000 6000
SCALE: 1"=6000'

AERIAL PHOTOGRAPH PROVIDED
BY KUCERA INTERNATIONAL, INC.
DATED DECEMBER 2022

LEGEND

- NEW WALES FACILITY
- HORIZONTAL ZONE OF DISCHARGE
- OTHER MOSAIC FERTILIZER, LLC HOLDINGS



AERIAL PHOTOGRAPH

Ardaman & Associates, Inc.
Geotechnical, Environmental and
Agricultural Consultants

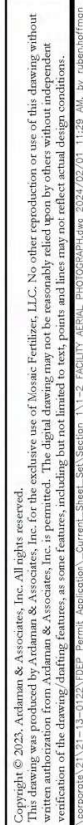
CONSTRUCTION PERMIT APPLICATION PHASE IV
PHOSPHOGYPSUM STACK EXTENSION, LLC

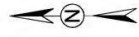
Mosaic
MOSAIC FERTILIZER, LLC
NEW WALES PLANT
MULBERRY, FLORIDA

DESIGNED BY: RDC	CHECKED BY: AA	DATE: 02/02/24
REV. NO.	APPROVED BY: MAH	DATE: 21-13-0122

Copyright © 2023, Ardaman & Associates, Inc. All rights reserved.
This drawing was produced by Ardaman & Associates, Inc. for the exclusive use of Mosaic Fertilizer, LLC. No other reproduction or use of this drawing without written authority from Ardaman & Associates, Inc. is permitted. The digital format of this drawing may not be retransmitted, copied, or otherwise used for any purpose other than the specific project and location identified in the drawing. All drawings are the property of Ardaman & Associates, Inc. and are not to be used for any other project without the written consent of Ardaman & Associates, Inc.

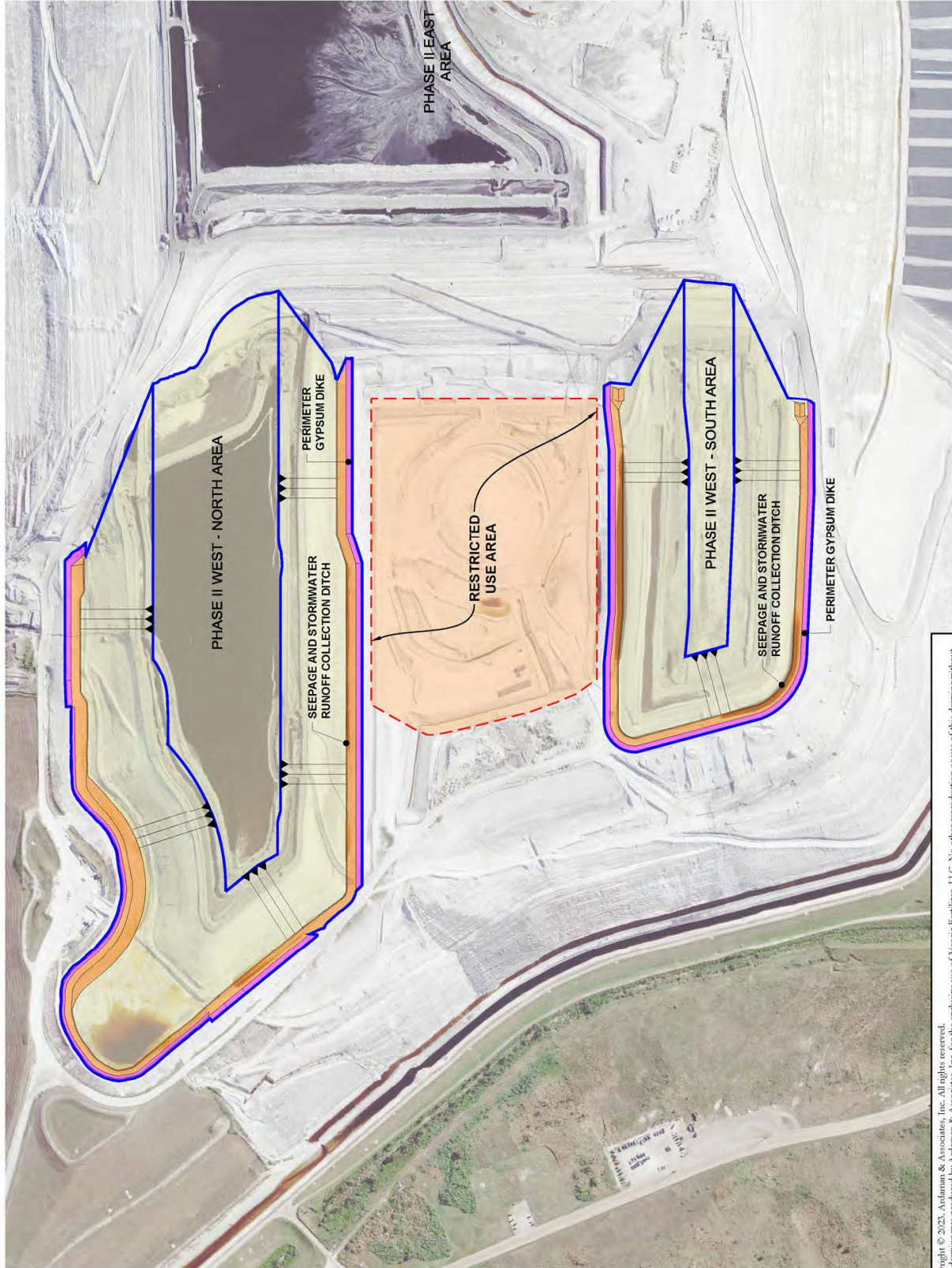
File: Corporate_V21-13-0122_V00P_Permit_Application_Current_Drawing_Series_V21-13-0122_V00P_Permit_Application_Current_Drawing 2024/02/01 11:24 AM, by: rusechormon





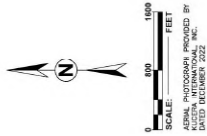
SCALE: 1"=400'

AERIAL PHOTOGRAPH PROVIDED BY
KICERA INTERNATIONAL, INC.
DATED DECEMBER 2022

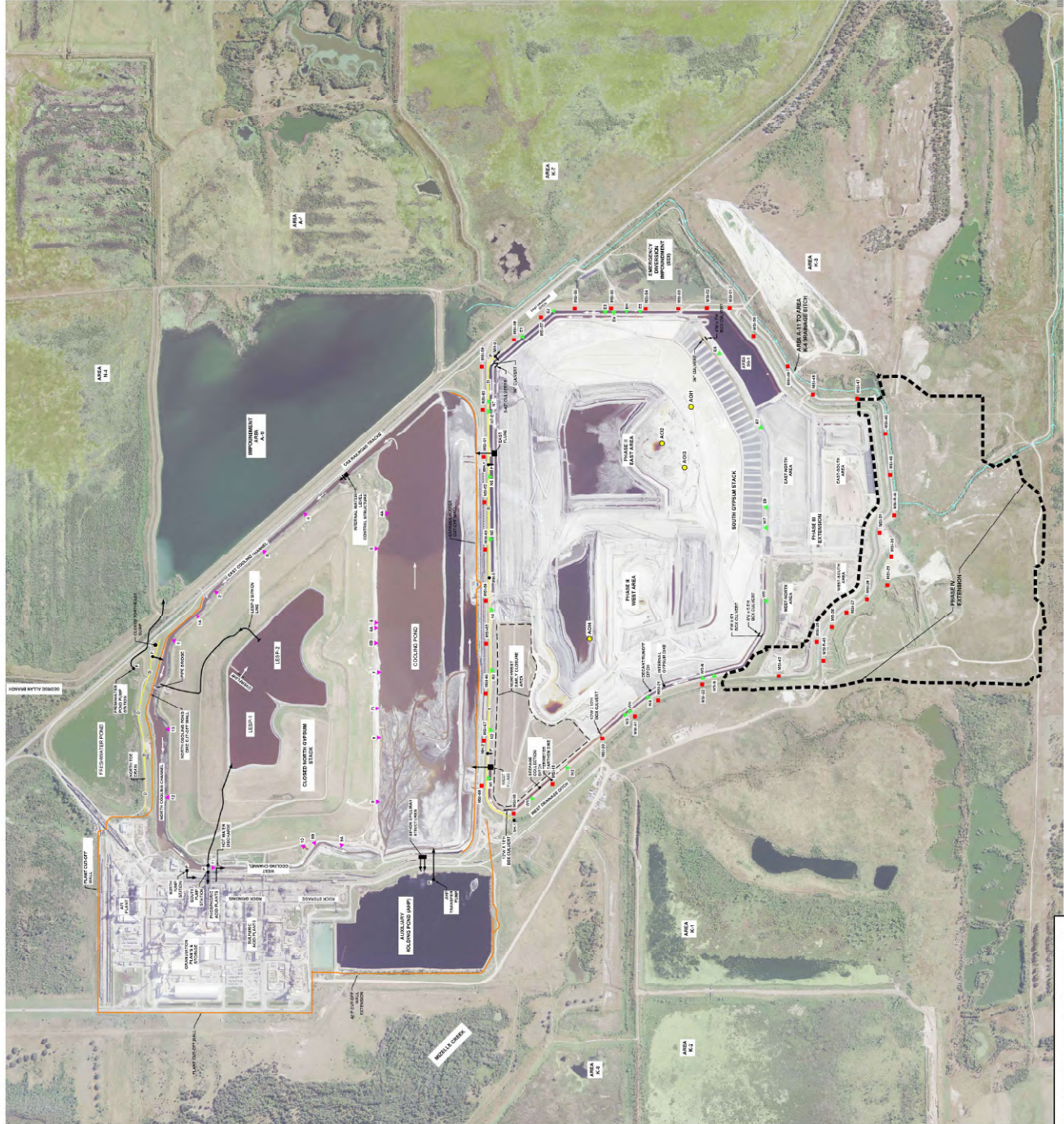


Copyright © 2023, Ardaman & Associates, Inc. All rights reserved.
This drawing was produced by Ardaman & Associates, Inc. for the exclusive use of Mosaic Fertilizer, LLC. No other reproduction or use of this drawing without
written authorization from Ardaman & Associates, Inc. is permitted. The digital format of this drawing may not be reprinted or otherwise reproduced without
verification of the drawing's content. The drawing is provided as a reference only and does not constitute a contract. The drawing is provided as a reference only and does not constitute a contract.
The drawing is provided as a reference only and does not constitute a contract. The drawing is provided as a reference only and does not constitute a contract.

PHASE II WEST RESTRICTED USE AREA AND NORTH AND SOUTH GYPSUM STACK AREAS		Ardaman & Associates, Inc. Geotechnical, Environmental and Materials Consultants	
CONSTRUCTION PERMIT APPLICATION PHASE IV PHOSPHOGYPSUM STACK EXTENSION		Mosaic NEW WALES PLANT MULBERRY, FLORIDA	
DESIGNED BY: RDC	CHECKED BY: AA	DATE: 02/02/23	PROJECT NO: 21-13-0122
APPROVED BY: MAH	DATE: 02/02/23	PROJECT NO: 21-13-0122	REVISION: 13

**LEGEND**

- D DRAIN
- P PUMP
- MH MANHOLE SUMP
- NS SOUTH GYPSUM STACK DRAIN OUTLET
- NS CUT-OFF WALL
- 1 CLOSED NORTH GYPSUM STACK SIDE SLOPE DRAIN OUTLET
- 1 PASSIVE SEISMIC MONITORING SYSTEM GEOPHYSICAL STATION
- MS-47 SUBSURFACE ANOMOLIES
- MS-47 SUBSURFACE ANOMOLIES



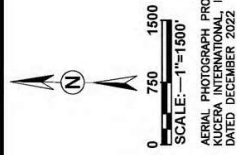
**AERIAL PHOTOGRAPH OF
PHOSPHOGYPSUM STACK SYSTEM**

Ardaman & Associates, Inc.
Geotechnical, Environmental, and
Materials Consultants

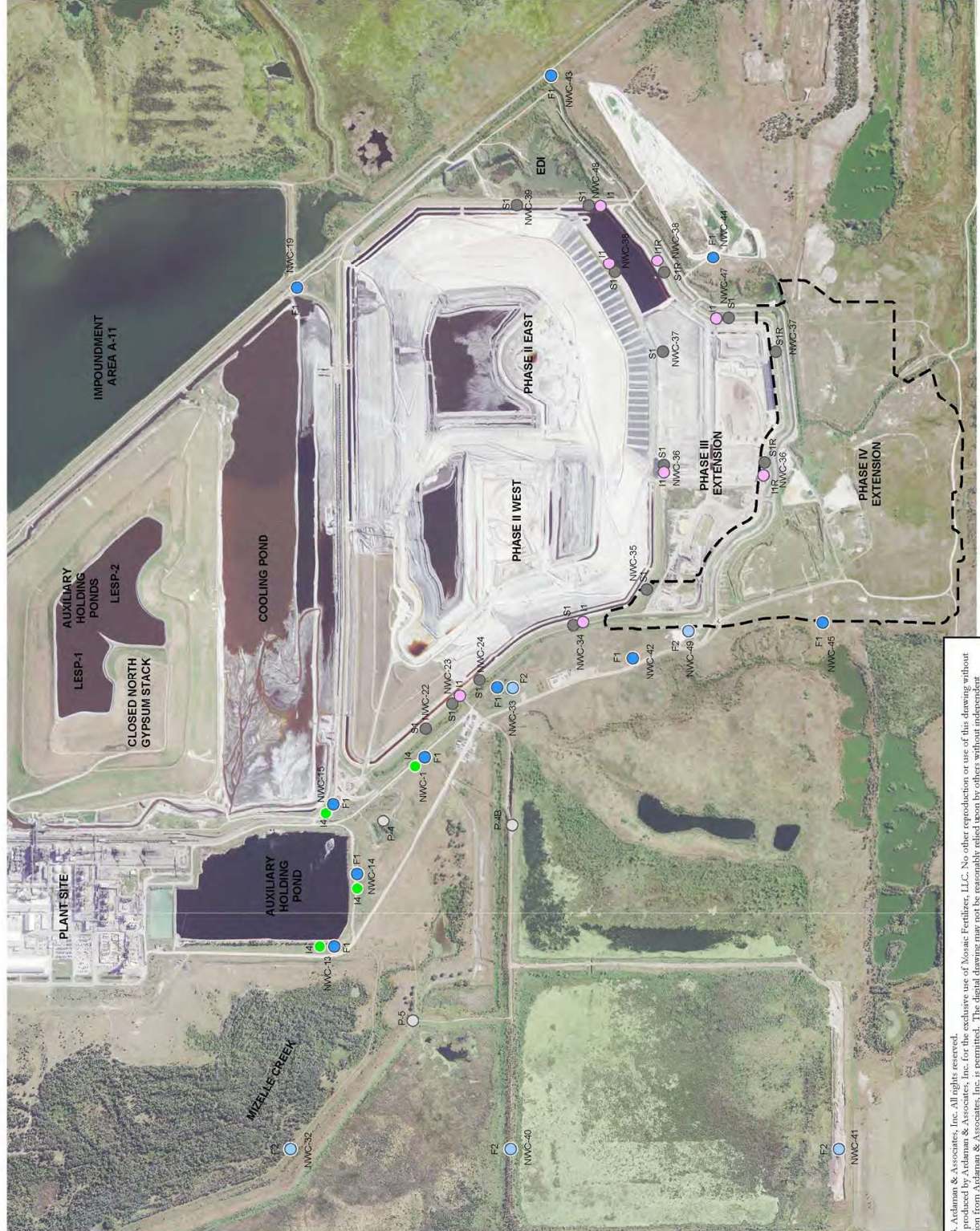
**CONSTRUCTION PERMIT APPLICATION PHASE IV
PHOSPHOGYPSUM STACK EXTENSION**

Mosaic
MOSAIC FERTILIZERS, LLC
NEW WALES PLANT
MULBERRY, FLORIDA

DRAWN BY: RDC
FILE NO.: 21-13-0122
CHECKED BY: AA
DATE: 02/02/24
APPROVED BY: MAH
1-4



- P ○ FLORIDIAN AQUIFER RECOVERY WELL
 S1 ● SURFICIAL AQUIFER SYSTEM MONITOR WELL
 I1 ● INTERMEDIATE AQUIFER SYSTEM MONITOR WELL
 I4 ● MOST TRANSMISSIVE ZONE MONITOR WELL
 F1 ● INTERMEDIATE AQUIFER SYSTEM MAJOR PRODUCING ZONE MONITOR WELL
 F2 ● UPPER FLORIDIAN AQUIFER SYSTEM MONITOR WELL IN UPPER PERMEABLE ZONE
 F2 ● UPPER FLORIDIAN AQUIFER SYSTEM MONITOR WELL IN LOWER PERMEABLE ZONE



Copyright © 2023, Ardaman & Associates, Inc. All rights reserved.
 This drawing was produced by Ardaman & Associates, Inc. for the exclusive use of Mosaic Fertilizer, LLC. No other reproduction or use of this drawing without written authorization from Ardaman & Associates, Inc. is permitted. The digital drawing may not be reprinted, reproduced, or otherwise used without the written verification of the drawing drafting features as shown. Features, including but not limited to text, points, and lines may not reflect actual design conditions.

R:\Corporates\21021-15-0122\VEP Permit Application_Corrupt_Sheet_Sect\Section 1\1-5 MONITOR WELL LOCATION PLANKING 2024\02/01 11:25 PM.rvt by ruben.norman

MONITOR WELL LOCATION PLAN

Ardaman & Associates, Inc.
 Geotechnical, Environmental, and
 Materials Consultants

CONSTRUCTION PERMIT APPLICATION PHASE IV
 PHOSPHOGYPSUM STACK EXTENSION

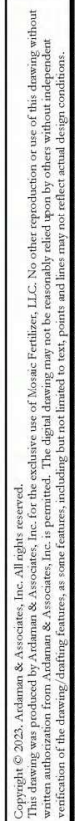
MOSAIC FERTILIZER, LLC
 NEW WALES PLANT

MULBERRY, FLORIDA

DRAWN BY: RDC
 CHECKED BY: AA
 DATE: 02/02/2024

REV. NO.
 21-15-0122

APPROVED BY: MAH
 REVISION: 15



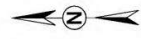
I:\Corporate\21\21-13-0122\FDEP Permit Application\Current_Sheet_Set\Section 1\1-6 GEOPHONE LOCATION PLAN.dwg 2024/02/01 7:40 PM, by ruben.hoffman

EXISTING GEOPHONE
BOREHOLE

FILE NO.	APPROVED BY:	DATE: 02/02/24	CHECKED BY: AA	DRAWN BY: RDC
FIGURE 4				

21-13-0122	MAH	1-6
------------	-----	-----







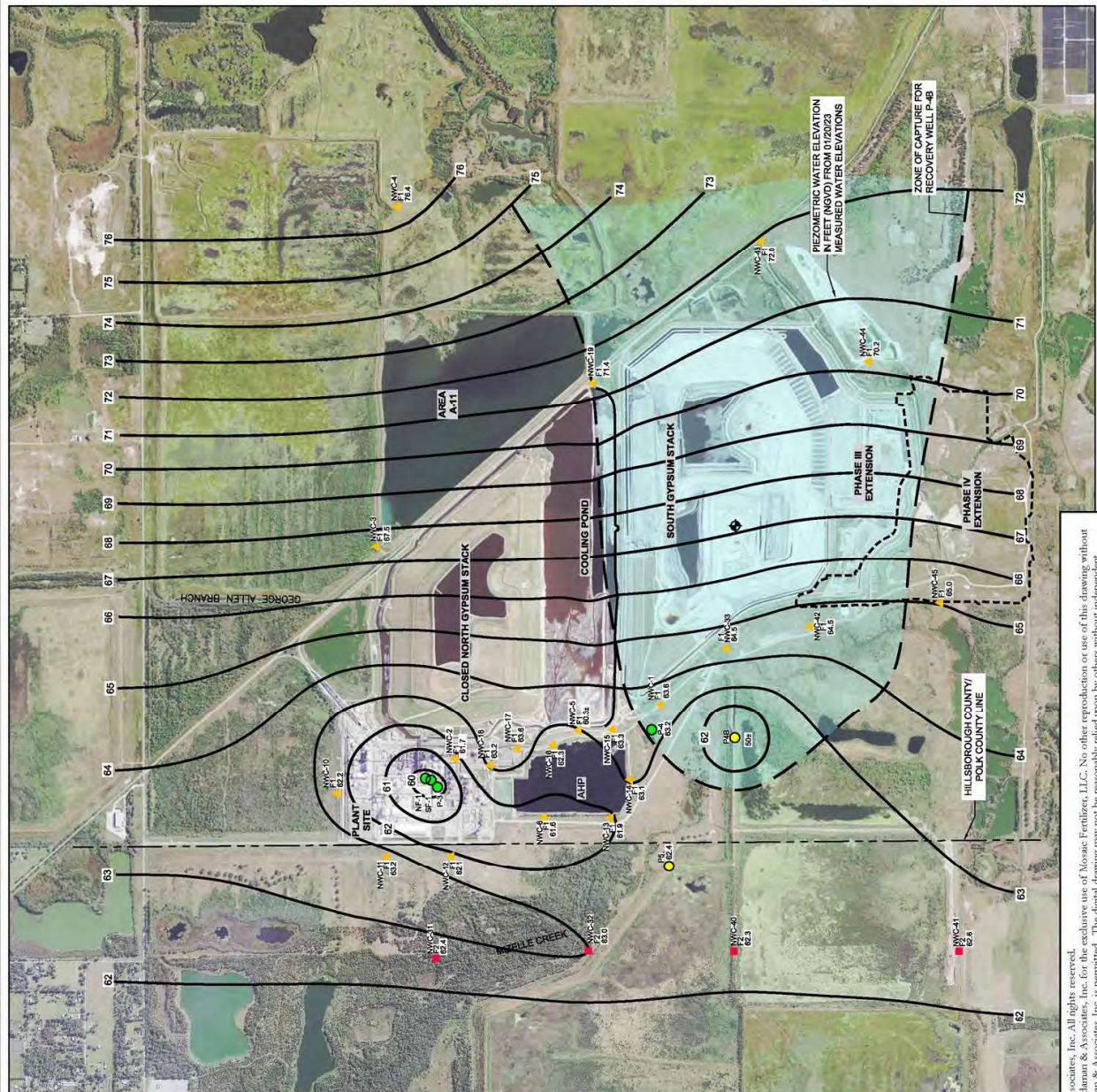
SCALE: 1"=500'
AERIAL PHOTOGRAPHY PROVIDED BY
KUCERA INTERNATIONAL, INC.
DATED DECEMBER 2022



Copyright © 2023, Ardaman & Associates, Inc. All rights reserved.
This drawing was produced by Ardaman & Associates, Inc. for the exclusive use of Mosaic Fertilizer, LLC. No other reproduction or use of this drawing without written authority from Ardaman & Associates, Inc. is permitted. The digital format of this drawing may not be retransmitted, copied, or otherwise used without the independent verification of the drawing's content. Features as shown are approximate and may not reflect actual design conditions.

\\Corporate\21\21-15-0122\VEP Permit Application_Correl_Sheet_Sect\Section 1\1-B AREA III-2 AND AREA 4 PIEZOMETER LOCATION MAP.dwg 2024/02/01 7:48 PM, by: kadebuffman

PHASE III EAST AREA III-2 AND AREA 4 PIEZOMETER LOCATION PLAN	
	Ardaman & Associates, Inc. Geotechnical, Environmental and Agriculture Consultants
	Mosaic Fertilizer, LLC NEW WALES PLANT MULBERRY, FLORIDA
DESIGNED BY: RDC	CHECKED BY: AA
DATE: 02/02/24	DATE: 02/02/24
APPROVED BY: MAH	APPROVED BY: MAH
21-15-0122	13



Copyright © 2023, Ardman & Associates, Inc. All rights reserved.
This drawing was produced by Ardman & Associates, Inc. for the exclusive use of Mosaic Fertilizer, LLC. No other reproduction or use of this drawing without written authorization from Ardman & Associates, Inc. is permitted. The digital drawing may not be reasonably relied upon by others without independent verification of the drawing/drafting features, as some features, including but not limited to text, points and lines may not reflect actual design conditions.

\\Corporate\21\21-13-0122\FDEP Permit Application\Current_Sheet_Set\Section 1\1-9 RECOVERY WELL P-4B TYPICAL ZONE OF CAPTURE.dwg 2024/02/01 7:52 PM, by a.floresherd@doz

RECOVERY WELL P-4B
ZONE OF CAPTURE

Ardaman & Associates, Inc.
Geotechnical, Environmental and
Materials Consultants

CONSTRUCTION PERMIT APPLICATION PHASE IV

PHOSPHOGYPSUM STACK EXTENSION 43

Mosaic
MOSAIC FERTILIZER, LLC
NEW WALES, PA 19380

MULBERRY, FLORIDA

DATE: 02/02/24	CHECKED BY: AA	DRAWN BY: AFH
----------------	----------------	---------------

FILE NO. 21-13-0122
APPROVED BY: MAH
FIGURE 1-9

2

APPX ATT_V4_1960

EPA'S OPPORTUNITY TO REVERSE THE FERTILIZER INDUSTRY'S ENVIRONMENTAL INJUSTICES

by Jaclyn Lopez

Jaclyn Lopez is a senior attorney with the Center for Biological Diversity.

SUMMARY

Seventy phosphogypsum stacks are scattered throughout the United States, concentrated in low-wealth and Black, indigenous, and people of color communities. These radioactive waste heaps have a long history of failures, and present a substantial hazard and unreasonable risk of harm. The U.S. Environmental Protection Agency (EPA) should swiftly move to regulate these environmental and public health hazards. This Article examines the regulatory failures that have given rise to the proliferation of phosphogypsum stacks in vulnerable communities and sensitive environments in the United States. It argues that EPA has the authority, and with President Joseph Biden's Executive Orders, the mandate to take corrective action to remedy these environmental injustices.

Over Easter weekend in 2021, the governor of Florida ordered a state of emergency for Manatee County and the evacuation of 300 homes because a phosphogypsum stack (or gypstack) was about to capsize and release a 20-foot tidal wave of wastewater and fertilizer waste.¹ Ultimately, the Florida Department of Environmental Protection (FDEP) authorized the owner of the Piney Point phosphogypsum stack to discharge wastewater into Tampa Bay, in an effort to prevent the stack from bursting open.² The discharge lasted almost two weeks and contained approximately 186 metric tons of nitrogen, which fueled a deadly red tide in Tampa Bay that killed nearly 2,000 tons of marine life,³ including more than 30

federally threatened Florida manatees.⁴ While Piney Point was a particularly well-documented, problematic phosphogypsum stack, it is not unique.

Many of the more than 70 mountainous piles of radioactive, toxic, and hazardous waste scattered throughout the United States are concentrated among low-wealth communities and have a long history of structural failures, releases, breaches, discharges, and even sinkholes.⁵ They pose a substantial present and future hazard and an unreasonable risk of injury to human health and the environment. Meanwhile, the fertilizer industry continues to pursue regulatory loopholes to relieve its regulatory burden and shift the risk of harm to the public. To date, the U.S. Environmental Protection Agency (EPA) has abdicated its responsibility to evaluate and minimize the unreasonable risk or ensure protection of human health and the environment through adequate regulation.

Given President Joseph Biden's Executive Order Protecting Public Health and the Environment and Restoring Science to Tackle the Climate Crisis⁶ and the ever-looming

Author's Note: The author is indebted to the invaluable work of Rachael Curran, a tireless advocate on this issue, and whose work co-authoring a petition to the U.S. Environmental Protection Agency to regulate phosphogypsum was essential to the framing of this Article. Jaclyn is also deeply appreciative of Kara Clauser and Curt Bradley, geographic information system specialists, for creating the graphics. Jaclyn also thanks the editorial staff at ELI.

1. Zachary T. Sampson, *Five Questions Answered About Piney Point Leak in Manatee County*, TAMPA BAY TIMES (Apr. 4, 2021), <https://www.tampabay.com/news/environment/2021/04/04/five-questions-answered-about-piney-point-leak-in-manatee-county/>.
2. *Id.*
3. MARCUS W. BECK ET AL., INITIAL ESTUARINE RESPONSE TO THE NUTRIENT-RICH PINEY POINT RELEASE INTO TAMPA BAY, FLORIDA (2021), <https://github.com/tbep-tech/piney-point-manu/blob/main/manu-draft.docx>; Jesse Mendoza, *Estuary Programs Blame Piney Point for Worsening Red Tide*

Conditions, SARASOTA HERALD-TRIB. (July 23, 2021), <https://www.heraldtribune.com/story/news/local/manatee/2021/07/23/local-estuary-programs-desantis-disagree-piney-point-and-red-tide/8067420002/>.

4. MARINE MAMMAL PATHOBIOLOGY LABORATORY, FLORIDA FISH AND WILDLIFE CONSERVATION COMMISSION, 2021 PRELIMINARY RED TIDE MANATEE MORTALITIES, JAN 01-DEC 03 (2021), <https://myfwc.com/media/25649/2021preliminaryredtide.pdf>.
5. Phosphogypsum Free America, *Home Page*, <https://phosphogypsumfreeamerica.org/> (last visited Dec. 10, 2021).
6. Exec. Order No. 13990, 86 Fed. Reg. 7037 (Jan. 25, 2021), <https://www.whitehouse.gov/briefing-room/presidential-actions/2021/01/20/executive-order-protecting-public-health-and-environment-and-restoring-science-to-tackle-climate-crisis/>.

failures of these ticking time bombs, the moment is ripe for EPA to take back federal control and put an end to these environmental and public health hazards. This Article examines the rise of phosphogypsum stacks and their placement throughout vulnerable communities and sensitive environments in the United States, and explains how President Biden's EPA has the authority and obligation to rein them in. It does not document the harm from the phosphate mining that makes phosphogypsum production possible, the direct water pollution from fertilizer factory effluent, or the impacts of pesticide and fertilizer application or runoff that result from the use of synthetic fertilizer, nor does it analyze the regulatory frameworks for addressing them.

I. What Is Phosphogypsum?

Phosphogypsum is the radioactive, toxic waste created during wet-process phosphoric acid production.⁷ Phosphoric acid is the intermediate feedstock of granular and liquid ammonium phosphate fertilizers.⁸ In the United States, phosphoric acid is produced from phosphate rock mined from mineral deposits in Florida, Idaho, North Carolina, and Utah, with the largest deposit and the majority of the nation's phosphate mining occurring in Florida, where 27 strip mines span more than 450,000 acres.⁹

After strip mining and beneficiation to remove sand and clay from the phosphate matrix, calcium phosphate ore is transported to a fertilizer plant for processing by chemically digesting the phosphate ore in sulfuric acid.¹⁰ This reaction results in a slurry of phosphoric acid and phosphogypsum (calcium sulfate dihydrate or calcium sulfate hemihydrate, depending on the type of wet process) as a suspended solid, at a rate of 5.2 tons of phosphogypsum waste for every one ton of phosphoric acid.¹¹ The phosphoric acid solution is filtered from the phosphogypsum and concentrated through evaporation to be sold as merchant-grade phosphoric acid, feed-grade phosphoric acid, and superphosphoric acid, or used as feedstock for finished fertilizer products like diammonium phosphate (DAP) or monoammonium phosphate (MAP).¹²

The phosphogypsum waste is then reslurried with recycled process wastewater and pumped via pipeline for disposal in a settling pond impoundment atop a waste pile known as a phosphogypsum stack,¹³ where the phospho-

gypsum settles, thereby growing the stack.¹⁴ The settled phosphogypsum is dredged to build up embankments at the sides of the impoundment containing the process wastewater.¹⁵ Cooling ponds containing process wastewater are also situated at or below grade along the perimeter of the stack.¹⁶ The process wastewater is meant to be primarily recycled in fertilizer plant operations, making uninterrupted plant operation critical to maintaining a negative process water balance.¹⁷ Even still, during periods of precipitation, discharges to surface waters are often permitted.¹⁸

While modern, active stacks and adjacent cooling ponds are lined with a single synthetic geomembrane liner, these liners can tear and are designed to leak (i.e., permeable), creating a "zone of discharge"¹⁹ in the surficial aquifer that in some cases is explicitly allowed by permit.²⁰ As a stack grows in height, the settling impoundment atop the stack decreases in size until the settling pond capacity becomes too small and the pumping height requires too much energy.²¹ At this point, the stack is either expanded horizontally, or it reaches the end of its useful life.²²

Phosphogypsum contains calcium sulfate and many contaminants, including radionuclides from uranium, thorium, and radium, which decay to harmful radon gas; toxic heavy metals; fluoride; ammonia; and residual phosphoric and sulfuric acids.²³ The process wastewater also contains these harmful toxic constituents and is highly acidic and corrosive, with pH (hydrogen ion concentration) measurements as low as 0.5.²⁴

Phosphogypsum stack systems are prone to extensive groundwater contamination, dike breaches, leakage, unexplained seepage, sinkholes, instability that threatens outright collapse, and excess process water balances in the event of a plant shutdown or abandonment necessitating intentional large-volume releases of process water to prevent further catastrophe.²⁵ Further, this underregulated

gypsum stack runoff, wastewater generated from the uranium recovery step of phosphoric acid production, process wastewater from animal feed production, and process wastewater from superphosphate production. Mining Waste Exclusion, Final Rule, 55 Fed. Reg. 2322, 2328 (Jan. 23, 1990). Uranium recovery from phosphate processing became uneconomical in the 1990s. Gerald Steiner et al., *Making Uranium Recovery From Phosphates Great Again?*, 54 ENV'T SCI. & TECH. 1287 (2020), <https://pubs.acs.org/doi/pdf/10.1021/acs.est.9b07859>.

14. REPORT TO CONGRESS, *supra* note 10, at 12-4.

15. *Id.*

16. *Id.*

17. *Id.* at 12-2.

18. *Id.*

19. The horizontal extent of a permitted zone of discharge is typically the property boundary, but groundwater contamination exceeding drinking water standards often extends well beyond the zone. REPORT TO CONGRESS, *supra* note 10, at 12-13.

20. FLA. ADMIN. CODE r. 62-673.320(6) (2013).

21. Olice C. Carter et al., *Investigation of Metal and Non-Metal Ion Migration Through an Active Phosphogypsum Stack*, in INTERNATIONAL LAND RECLAMATION AND MINE DRAINAGE CONFERENCE AND THIRD INTERNATIONAL CONFERENCE ON THE ABATEMENT OF ACIDIC DRAINAGE 199 (U.S. Department of the Interior 1994).

22. *Id.*; see also Ardaman & Associates, Phase III Expansion Application, Mosaic Fertilizer, LLC—New Wales Facility, FDEP Permit #MMR_FL0036421 (Oct. 25, 2019); REPORT TO CONGRESS, *supra* note 10, at 12-31.

23. REPORT TO CONGRESS, *supra* note 10, at 12-3.

24. *Id.* at 12-4.

25. *Id.* at 12-31.

7. U.S. EPA, *TENORM: Fertilizer and Fertilizer Production Wastes*, <https://www.epa.gov/radiation/tenorm-fertilizer-and-fertilizer-production-wastes> (last updated Nov. 5, 2021).

8. U.S. GEOLOGICAL SURVEY, MINERAL COMMODITY SUMMARIES 2020 (2020), <https://pubs.usgs.gov/periodicals/mcs2020/mcs2020.pdf>.

9. *Id.*; FDEP, *Phosphate*, <https://floridadep.gov/water/mining-mitigation/content/phosphate> (last modified Sept. 15, 2021).

10. U.S. EPA, REPORT TO CONGRESS ON SPECIAL WASTES FROM MINERAL PROCESSING 12-1 (1990), <https://www.epa.gov/sites/default/files/2015-05/documents/2000d96z.pdf> [hereinafter REPORT TO CONGRESS].

11. U.S. EPA, *supra* note 7.

12. *Id.*

13. Alternatively called "pond water" by industry and state regulating agencies. See FIPR Institute, *Process Water*, <https://fipr.floridapoly.edu/about-us/phosphate-primer/process-water.php> (last visited Dec. 10, 2021) (Typical Pond Water Analysis table). "Process wastewater" also includes phospho-

waste stream has been abused as a repository for illegal dumping for other already designated hazardous wastes.²⁶

The U.S. phosphate fertilizer industry is responsible for generating approximately 46 million tons of phosphogypsum in the United States annually.²⁷ And while 50% of the phosphoric acid product is exported,²⁸ 100% of the phosphogypsum waste remains in the United States, stored in ever-expanding phosphogypsum stacks near the fertilizer facilities that generated them.²⁹ A phosphogypsum stack can be more than one square mile wide³⁰ and 500 feet tall,³¹ and store more than one billion gallons of process wastewater.³² More than 30 million tons of phosphogypsum per year are produced in Florida alone,³³ and an estimated one billion tons are already stacked there.³⁴

There are no imminent shortages of phosphate rock, and global consumption of phosphoric acid is expected to increase by three million tons in 2023.³⁵ In Florida, where the majority of the nation's phosphate mining occurs, the phosphate industry plans to strip mine an additional 90,905 acres for phosphate over the next 50 years, producing approximately another billion tons of phosphogypsum from processing Florida phosphate rock alone.³⁶ Thus, these mountains of radioactive waste that are already a part of several states' environmental legacies will only get exponentially larger and more dangerous with time if EPA does not take immediate action.

A. Documented Phosphogypsum Stack Failures Throughout the United States

On April 6, 1992, the southern retaining wall of Mobil Mining and Mineral's No. 3 phosphogypsum stack experienced structural failure, releasing 45 million gallons of phosphogypsum and process water with a pH of less than two standard units.³⁷ The release flowed into Cotton Patch Bayou and eventually the Houston Ship Channel through a barge basin, covering large areas of terrestrial and aquatic habitat and adversely affecting surface water quality within approximately seven miles of the Houston Ship Channel, resulting in a fish and macro-crustacean kill.³⁸ Freshwater, marine, and estuarine wildlife, fish, invertebrates, plants, and sediments all sustained injuries, as well as terrestrial wildlife, plants, and soils.³⁹ Cotton Patch Bayou was severely impacted, and prior to the release the bayou had provided habitat for species of songbirds and wading birds, terrestrial reptiles, amphibians, mammals, crayfish, and numerous other invertebrates.⁴⁰

During a Florida rainstorm on December 7, 1997, the crest of the south wall containing a settlement pond atop the Mulberry facility's south stack washed out, causing approximately 54 million gallons of process wastewater and an undetermined amount of phosphogypsum slurry to spill into the North Prong of the Alafia River,⁴¹ eventually traversing 35 miles of the Alafia River before reaching Hillsborough and Tampa Bays.⁴² With a pH of 2, the process wastewater discharge drastically altered pH throughout the length of the Alafia River, with post-spill pH measurements ranging from 2.8 standard units in the upper, freshwater portion of the river to 4 standard units in the lower, estuarine portion.⁴³

Reported as the "worst environmental disaster in the Alafia River's history," the spill caused a significant fish kill throughout the length of the river from Mulberry to Hillsborough Bay, including an estimated 1.3 billion baitfish and shellfish and 72,900 gamefish.⁴⁴ The spill also caused injuries to freshwater benthic communities, oysters, and mussels.⁴⁵ Through the loss of habitat and prey, the spill may also have indirectly injured animals that utilize the Alafia River and surrounding wetlands, including for

26. See Consent Decree, *United States v. Mosaic Fertilizer, LLC*, No. 15-cv-04889 (E.D. La. Sept. 30, 2015), https://www.epa.gov/sites/production/files/2015-10/documents/mosaiclouisiana-cd_0.pdf; Consent Decree, *United States v. Mosaic Fertilizer, LLC*, No. 15-cv-02286 (M.D. Fla. Sept. 30, 2015), <https://www.epa.gov/sites/production/files/2016-03/documents/florida-cd.pdf>; Consent Decree, *United States v. J.R. Simplot Co. & Simplot Phosphates, LLC*, No. 20-CV-125-F (D. Wyo. July 9, 2020), <https://www.epa.gov/sites/production/files/2020-07/documents/jrsimplotcompany-cd.pdf>.

27. THE FERTILIZER INSTITUTE, REVISED REQUEST FOR APPROVAL OF ADDITIONAL USES OF PHOSPHOGYPSUM PURSUANT TO 40 C.F.R. §61.206, at 6 (2020), https://www.epa.gov/sites/production/files/2020-10/documents/4-72020_pg_petition.pdf.

28. Stephen M. Jasinski, *Phosphate Rock*, in MINERAL COMMODITY SUMMARIES 2021 (U.S. Geological Survey 2021), <https://pubs.usgs.gov/periodicals/mcs2021/mcs2021-phosphate.pdf>.

29. *Id.*

30. U.S. EPA, *supra* note 7.

31. *Id.*

32. JBM&R Engineering, Inc., 2020 Interim Stack System Management Plan, Mosaic Fertilizer, LLC—New Wales Facility, FDEP Permit #MMR_FL0036421 (June 25, 2020).

33. William C. Burnett et al., *Radionuclide Flow During the Conversion of Phosphogypsum to Ammonium Sulfate*, 32 J. ENV'T RADIOACTIVITY 33 (1996), [https://doi.org/10.1016/0265-931X\(95\)00078-O](https://doi.org/10.1016/0265-931X(95)00078-O).

34. Francisco Macías et al., *Environmental Assessment and Management of Phosphogypsum According to European and United States of America Regulations*, 17 *PROCEDIA EARTH & PLANETARY SCI.* 666, 667 (2017), <https://doi.org/10.1016/j.proeps.2016.12.178>.

35. U.S. GEOLOGICAL SURVEY, *supra* note 8.

36. Based on a projected 734,170,244 tons of phosphate rock production in central Florida over a 50-year period. See U.S. ARMY CORPS OF ENGINEERS, *AREAWIDE ENVIRONMENTAL IMPACT STATEMENT FOR THE CENTRAL FLORIDA PHOSPHATE DISTRICT* app. H tbls.3 & 5 (2013). Using the wet process, it takes 3.3 metric tons of phosphate rock to produce one metric ton of phosphoric acid (1 metric ton equals 1.10231 tons). ML2R Consultancy, *Raw Materials Requirements*, <http://ml2rconsultancy.com/raw-materials-requirements/> (last visited Dec. 10, 2021).

37. Consent Decree for Natural Resource Damages, *United States v. Mobil Mining & Minerals Co.*, No. H96-0695 (S.D. Tex. June 13, 1996).

38. *Id.*

39. *Id.*

40. *Id.*

41. Amundsen & Moore, Summary Report of Determination of Cause of Process Water Discharge From South Gypsum Stack Expansion Area, Mulberry Phosphates, Inc., Mulberry, Polk County, Florida 1, FDEP Permit #MMR_FL0334944 (Jan. 20, 1998).

42. National Oceanic and Atmospheric Administration, Final Damage Assessment and Restoration Plan and Environmental Assessment for the December 7, 1997 Alafia River Spill 6 (July 21, 2000), <https://www.gc.noaa.gov/gc-rp/muldarp2.pdf>.

43. *Id.*

44. Tom Palmer, *Alafia River Appears to Have Healed After Acid Spill*, LEDGER (Dec. 9, 2007), <https://www.theledger.com/story/news/2007/12/09/alafia-river-appears-to-have-healed-after-acid-spill/25860770007/>.

45. National Oceanic and Atmospheric Administration, *supra* note 42, at 10.

breeding.⁴⁶ Approximately 377 acres of freshwater vegetation were injured or lost to the spill, including the die-off of freshwater wetland vegetation and eight acres of mature hardwoods.⁴⁷ Due to the 350 tons of nitrogen ultimately sent to Tampa Bay,⁴⁸ the spill caused imbalances in aquatic fauna, algae blooms, and increased chlorophyll *a* concentrations in both the river and bay through the following year.⁴⁹ A consultant-led investigation later determined that the dike breach formed because of the routine removal of a decant pipe and subsequent backfilling of the pipe trench with phosphogypsum, a process “similar to that used by many gypsum stack operators worldwide.”⁵⁰

During Hurricane Frances on September 5, 2004, high winds and rain eroded a berm atop a phosphogypsum stack at Cargill Fertilizer’s Riverview facility,⁵¹ causing 65 million gallons of process wastewater to discharge into South Archie Creek and eventually Hillsborough Bay.⁵² The spill caused documented death and injury to many estuarine-dependent species, including tidal marsh, red, black, and white mangrove forests, salt grass, blue crab, fiddler crab, various shrimp species, water column organisms, seagrasses, sand seatrout, striped mullet, spadefish, stingray, croaker, menhaden, sea robin, hog choker, white grunt, scaled sardine, mojarra, spotted seatrout, red drum, and common snook.⁵³ In addition, the open waters of Hillsborough Bay provide important habitat for seabirds, marine fish species, and marine mammals like the bottlenose dolphin and West Indian manatee, although no direct injuries of these species were observed.⁵⁴ Approximately 78.4 acres of mangroves and 57.3 acres of tidal marsh experienced die-off, while 21.57 of 24.44 acres of seagrass along the shoreline of Hillsborough Bay showed signs of stress after contact with the process wastewater, with the remaining 2.87 acres of seagrass no longer visible after the discharge.⁵⁵

On April 14, 2005, a rainfall of 26 centimeters (cm) in less than 24 hours caused a stack breach at the Mississippi Phosphates facility, releasing more than 17 million gallons of process wastewater and damaging marsh vegetation, fish, and oysters at the Bangs Lake station of the Grand Bay National Estuarine Research Reserve.⁵⁶ Seven years later, after 76 cm of rain fell from August 28-30 due to Hurricane Isaac, the facility released another 90 million gallons of process wastewater over the course of three days into Bayou Cosette, where a fish kill was observed.⁵⁷

Prior to filing for bankruptcy, Mississippi Phosphates had been cited for hundreds of violations of its Clean Water Act (CWA)⁵⁸ permit for discharging wastewater that exceeded limits for ammonia, phosphorus, total suspended solids, fluoride, temperature, and pH.⁵⁹ In 2015, the company pleaded guilty to discharging more than 38 million gallons of acidic process wastewater in August 2013, failing to treat the water with caustics to mitigate its toxicity to marine life as required by its permit.⁶⁰ The illegal discharge resulted in the death of more than 47,000 fish and the closing of Bayou Cosette, one of the most productive nurseries for aquatic species on the Gulf Coast.⁶¹

Piney Point was a Florida phosphate fertilizer plant owned and operated by multiple different corporations from 1966 until operations ceased in 1999.⁶² Historically, Piney Point consisted of an acid plant, a phosphoric acid plant, an ammoniated phosphate fertilizer plant with storage for ammonia, phosphoric acid, and other products necessary for the manufacture of fertilizer, and related facilities.⁶³ In February 2001, Mulberry Corporation filed for bankruptcy and provided the FDEP with 48 hours’ notice that it was abandoning the property.⁶⁴ Between 2001 and 2004, FDEP discharged approximately 1.1 billion gallons of precipitation and process wastewater from Piney Point into Tampa Bay and Bishop Harbor.⁶⁵

In 2011, Piney Point again discharged 169 million gallons of wastewater.⁶⁶ On March 25, 2021, HRK Holdings, LLC reported to FDEP increased flow and conductivity measurements in the drains that surround the phosphogypsum impoundments. FDEP authorized the discharge of 215 million gallons of toxic wastewater into Tampa Bay.⁶⁷ The discharge contained significant amounts of nutrients, including nearly 200 metric tons of nitrogen.⁶⁸ That pollution fueled a red tide and fish kill in Tampa Bay,⁶⁹ and gave rise to a lawsuit under the Resource Conservation

46. *Id.* at 11.

47. *Id.* at 15.

48. Palmer, *supra* note 44.

49. National Oceanic and Atmospheric Administration, *supra* note 42, at 22.

50. Amundsen & Moore, *supra* note 41, at 4-5.

51. Now owned by Mosaic Fertilizer, LLC.

52. Complaint for Natural Resource Damages, *United States v. Mosaic Fertilizer, LLC*, No. 13-cv-00386-RAL-TGW (M.D. Fla. Feb. 11, 2013).

53. Consent Decree app. A at 9, *United States v. Mosaic Fertilizer, LLC*, No. 13-cv-00386-RAL-TGW (M.D. Fla. Feb. 11, 2013).

54. *Id.* at 10.

55. *Id.* at 11.

56. Marcus W. Beck et al., *Water Quality Trends Following Anomalous Phosphorus Inputs to Grand Bay, Mississippi, USA*, 29 GULF & CARIBBEAN RSCH. 1 (2018), <https://aquila.usm.edu/cgi/viewcontent.cgi?article=1540&context=gcr>.

57. *Id.*

58. 33 U.S.C. §§1251-1387, ELR STAT. FWPCA §§101-607.

59. Felony Information, *United States v. Mississippi Phosphates Corp.*, No. 1:15-cr-00058LG-RHW (S.D. Miss. sentence entered Aug. 19, 2015).

60. *Id.*

61. *Id.*

62. Christopher O’Donnell, *Piney Point From 1966-Present: On the Edge of Disaster*, TAMPA BAY TIMES (Apr. 24, 2021), <https://www.tampabay.com/news/environment/2021/04/06/piney-point-from-1966-present-on-the-edge-of-disaster/>.

63. *Id.*

64. Robert Trigaux, *Executives Turn Their Backs on the Piney Point Disaster*, TAMPA BAY TIMES (Sept. 1, 2005), <https://www.tampabay.com/archive/2003/08/18/executives-turn-their-backs-on-the-piney-point-disaster/>.

65. John Rehill, *Piney Point 1966-2011: A Retrospective*, BRADENTON TIMES, <https://thebradentontimes.com/piney-point-a-retrospective-p6328-158>, htm (last visited Dec. 10, 2021).

66. Cooper Levey-Baker, *Environmental Nonprofits Sue State, Property Owners Over Piney Point Disaster*, SARASOTA MAG. (June 25, 2021), <https://www.sarasotamagazine.com/news-and-profiles/2021/06/piney-point-lawsuit>.

67. FDEP, Emergency Final Order, DEP #21-0169 (Mar. 29, 2021), <https://floridadep.gov/sites/default/files/21-0323.pdf>.

68. Jessica Meszaros, *Tampa Bay Algae Blooms Could Be Fed by Piney Point Wastewater*, WUSF PUB. MEDIA (June 11, 2021), <https://wusfnews.wusf.usf.edu/environment/2021-06-11/tampa-bay-algae-blooms-could-be-fed-by-piney-point-wastewater>.

69. *Id.*; Kimberly Kuizon, *Trail of Dead Fish Leads to Piney Point, Prompting Concern*, FOX 13 TAMPA BAY (June 10, 2021), <https://www.fox13news.com/news/trail-of-dead-fish-leads-to-piney-point-prompting-concern>.

and Recovery Act (RCRA)⁷⁰ and the CWA.⁷¹ The FDEP recently issued a permit authorizing the deep well injection of the remaining wastewater despite a state ban on the deep well injection of hazardous waste.⁷²

B. Routine Violations of Permit Conditions

As an initial matter, it was historically industrywide practice to illegally commingle other mining-related hazardous waste with phosphogypsum and process wastewater. Operations at Piney Point illustrate how the industry's MAP and/or DAP production process waste was routinely mixed with phosphogypsum and process water. In 1990, Royster Phosphates, Inc., then-operator of the Piney Point facility, provided EPA with its response to a regulatory questionnaire entitled "National Survey of Solid Wastes From Mineral Processing Facilities." The questionnaire was "designed to obtain information on the generation and management of selected solid wastes from mineral processing facilities."⁷³

The questionnaire was EPA's method of fulfilling the congressional requirement that EPA determine whether "special wastes" such as phosphogypsum should be subject to the requirements of Subtitle C of RCRA, the chapter of RCRA that focuses on hazardous wastes. Royster Phosphates, Inc.'s response to EPA's questionnaire included maps of the Piney Point facility that demonstrate the facility utilized a MAP and/or DAP production process. The maps identify both a DAP plant as well as a "diammonium phosphate pond" at the site and show that the waste stream from the DAP production process was disposed of in the phosphogypsum stack system.

In 2015, EPA announced a record \$2 billion RCRA settlement with Mosaic Fertilizer, LLC for illegally commingling 60 billion pounds of hazardous waste with Bevill-exempt waste at several facilities in Florida and Louisiana.⁷⁴ More recently, EPA settled with J.R. Simplot Company in July 2020, where the company agreed to pay a civil penalty of \$775,000, also for placing hazardous wastes in a Bevill-exempt phosphogypsum stack system.⁷⁵

II. Regulatory Framework

There are several applicable laws, regulations, and policies that individually, and certainly when read together, should result in the robust regulation of phosphogypsum. These

frameworks are based on the fundamental principle that the federal government has an obligation to protect communities and the environment from harm from industrial waste. President Biden's recent Executive Orders call on all federal agencies to address environmental injustices.

RCRA directs EPA to protect human health and the environment from hazardous waste. The Toxic Substances Control Act (TSCA)⁷⁶ tasks EPA with managing the unacceptable risks of chemicals to human health and the environment. The Clean Air Act (CAA)⁷⁷ requires EPA to regulate air emissions that may present a risk to human health or the environment. The National Environmental Policy Act (NEPA)⁷⁸ mandates all federal agencies to consider the environmental consequences of their actions, prior to acting. Yet, with all these environmental safety nets, there are still billions of tons of radioactive waste decaying in dozens of communities throughout the United States, leaking, breaching, contaminating soil and water, and putting human lives at risk.

A. Executive Orders on Environmental Justice

In the first few days of his presidency, President Biden directed every agency to make environmental justice a part of their missions and to develop and implement programs and policies that address "the disproportionate health, environmental, economic, and climate impacts on disadvantaged communities."⁷⁹ EPA's working definition of "environmental justice" is: "The fair treatment and meaningful involvement of all people regardless of race, color, national origin, or income, with respect to the development, implementation, and enforcement of environmental laws, regulations, and policies."⁸⁰

President Biden's Executive Order No. 14008 establishes a White House Environmental Justice Interagency Council and a White House Environmental Justice Advisory Council to ensure agencies work to address environmental injustices.⁸¹ It also creates the "Justice40 Initiative" with the goal that 40% of federal investments benefit disadvantaged communities,⁸² and instructs the chair of the White House Council on Environmental Quality (CEQ) to develop a screening tool to prioritize disadvantaged

70. 42 U.S.C. §§6901-6992k, ELR STAT. RCRA §§1001-11011.

71. Center for Biological Diversity v. DeSantis, No. 8:21-cv-1521-WFJ-CPT (M.D. Fla. June 24, 2021). [Editor's Note: Jaclyn Lopez represents the Center for Biological Diversity (and co-plaintiffs) in this case.]

72. FDEP UIC Permit No. 0322708-002-UC/11 (Dec. 16, 2021); FLA. STAT. §403.7222 (2020); FLA. ADMIN. CODE r. 17-28.20 (1985); FLA. ADMIN. CODE r. 62-528.400 (2020).

73. U.S. EPA, National Survey of Solid Wastes From Mineral Processing Facilities, at i (1989) (OMB #2050-0098).

74. U.S. EPA, *Mosaic Fertilizer, LLC Settlement*, <https://www.epa.gov/enforcement/mosaic-fertilizer-llc-settlement> (last updated Nov. 15, 2021).

75. Complaint, *United States v. J.R. Simplot Co. & Simplot Phosphates, LLC*, No. 20-CV-125-F (D. Wyo. July 9, 2020), <https://www.justice.gov/enrd/consent-decree/file/1293116/download>.

76. 15 U.S.C. §§2601-2692, ELR STAT. TSCA §§2-412.

77. 42 U.S.C. §§7401-7671q, ELR STAT. CAA §§101-618.

78. 42 U.S.C. §§4321-4370h, ELR STAT. NEPA §§2-209.

79. Exec. Order No. 14008, 86 Fed. Reg. 7619 (Feb. 1, 2021), <https://www.govinfo.gov/content/pkg/FR-2021-02-01/pdf/2021-02177.pdf>; Fact Sheet, The White House, President Biden Takes Executive Actions to Tackle the Climate Crisis at Home and Abroad (Jan. 27, 2021), <https://www.whitehouse.gov/briefing-room/statements-releases/2021/01/27/fact-sheet-president-biden-takes-executive-actions-to-tackle-the-climate-crisis-at-home-and-abroad-create-jobs-and-restore-scientific-integrity-across-federal-government/>.

80. U.S. EPA, *Environmental Justice*, <https://www.epa.gov/environmentaljustice> (last updated Oct. 29, 2021).

81. Fact Sheet, The White House, *supra* note 79; News Release, U.S. EPA, EPA Administrator Announces Agency Actions to Advance Environmental Justice (Apr. 7, 2021), <https://www.epa.gov/newsreleases/epa-administrator-announces-agency-actions-advance-environmental-justice>.

82. Exec. Order No. 14008, 86 Fed. Reg. 7619 (Feb. 1, 2021).

communities and evaluate impacts of federally funded or authorized projects.⁸³

The White House Environmental Justice Interagency Council is charged with developing strategies to address environmental injustice and measures for accountability. The White House Environmental Justice Advisory Council, a nonfederal stakeholder group, will provide recommendations to the CEQ chair on how to address environmental injustices.⁸⁴

Executive Order No. 12898 instructs federal agencies to address adverse health and environmental effects on Black, indigenous, and people of color (BIPOC) and low-wealth populations.⁸⁵ While the Executive Order does not provide a direct right to judicial review,⁸⁶ courts have reviewed environmental justice claims under the Administrative Procedure Act's arbitrary and capricious standard.⁸⁷

B. RCRA

Finding that land is “too valuable a national resource to be needlessly polluted by discarded materials,”⁸⁸ the U.S. Congress passed RCRA in 1976 to address increasing problems associated with the growing volume of industrial and municipal waste. RCRA's goals include reducing the amount of solid waste generated, ensuring that these wastes are managed in an environmentally sound manner,⁸⁹ and protecting human health and the environment from the potential hazards of waste disposal. To achieve these goals, RCRA established two distinct programs: (1) the solid waste program, under RCRA Subtitle D, encourages states to develop comprehensive plans to manage nonhazardous industrial solid waste and municipal solid waste, sets criteria for municipal solid waste landfills and other solid waste disposal facilities, and prohibits the open dumping of solid waste; and (2) the hazardous waste program, under RCRA Subtitle C, establishes a “cradle to grave” system for controlling hazardous waste from the time it is generated until its final disposal.

83. *Id.*

84. U.S. EPA Charter, White House Environmental Justice Advisory Council (WHEJAC) (2021), https://www.epa.gov/sites/default/files/2021-03/documents/charter_for_the_white_house_environmental_justice_advisory_council.pdf.

85. 59 Fed. Reg. 7629 (Feb. 11, 1994).

86. *Id.* at 7633.

87. *See, e.g.,* Coliseum Square Ass'n, Inc. v. Jackson, 465 F.3d 215, 232, 36 ELR 20195 (5th Cir. 2006) (environmental justice study part of NEPA analysis reviewed as part of administrative record subject to arbitrary and capricious review); *Standing Rock Sioux Tribe v. U.S. Army Corps of Eng'rs*, 255 F. Supp. 3d 101, 140, 47 ELR 20035 (D.D.C. 2017); *Latin Ams. for Soc. & Econ. Dev. v. Administrator of the Fed. Highway Ass'n*, 756 F.3d 447 (6th Cir. 2014); *but see City of Dallas, Tex. v. Hall*, No. 3-07-cv-0060-P, 2007 U.S. Dist. LEXIS 78847, 2007 WL 3125311, at *6 (N.D. Tex. Oct. 24, 2007) (if mandates of Executive Orders are not part of NEPA analysis, then agency's compliance with Executive Orders is not subject to review under the Administrative Procedure Act's arbitrary and capricious standard).

88. 42 U.S.C. §6901(b).

89. “Solid waste” means any garbage, refuse, sludge from a waste treatment plant, water supply treatment plant, or air pollution control facility and other discarded material, including solid, liquid, semisolid, or contained gaseous material resulting from industrial, commercial, mining, and agricultural operations, and from community activities,” subject to certain exclusions. *Id.* §6903(27).

Within the meaning of solid waste, RCRA further defines “hazardous waste” as any discarded material “which because of its quantity, concentration characteristics, or physical, chemical or infectious characteristics may—

(A) cause, or significantly contribute to an increase in mortality or an increase in serious irreversible, or incapacitating reversible, illness; or

(B) pose a substantial present or potential hazard to human health or the environment when improperly treated, stored, transported, or disposed of, or otherwise managed.”⁹⁰

In its proposed regulatory framework for implementing the RCRA Subtitle C hazardous waste program, EPA first introduced the concept of “special wastes,” which include mining, beneficiation, and ore processing because of their typically high volumes and perceived low—but at the time understudied—hazard to human health and the environment. While EPA's “special wastes” concept did not make it into the final rules published in 1980, it formed the basis of the Bevill Amendment passed by Congress later that year.

1. The Bevill Amendment

The 1980 Bevill Amendment suspended EPA's authority to regulate “special wastes,” including mining and mineral processing wastes, as hazardous under Subtitle C until six months after EPA's completion of a detailed study on the adverse human health and environmental effects and a published Bevill determination for each particular category of special waste. Study requirements for mineral processing wastes like phosphogypsum and process wastewater included analysis of the following:

- (1) the source and volumes generated per year;
- (2) present disposal and utilization practices;
- (3) potential danger, if any, to human health and the environment from disposal and reuse of such materials;
- (4) documented cases in which danger to human health or the environment has been proved;
- (5) alternatives to current disposal methods;
- (6) the costs of such alternatives;
- (7) the impact of those alternatives on the use of phosphate rock and uranium ore, and other natural resources; and
- (8) the current and potential utilization of such materials.⁹¹

EPA took more than a decade to make a Bevill determination for mineral processing wastes, including phosphogypsum and process wastewater.⁹²

90. *Id.* §6903(5).

91. *Id.* §6982(p).

92. Special Wastes From Mineral Processing (Mining Waste Exclusion); Final Regulatory Determination and Final Rule, 56 Fed. Reg. 27300 (June 13, 1991).

2. The Simpson Amendment

The 1984 Simpson Amendment provided that EPA can modify some of the requirements of Subtitle C for special wastes that the Agency determines are hazardous waste. The modifications can account for the unique characteristics of mining and processing wastes and the practical difficulties associated with implementation, but must “assure protection of human health and the environment.”⁹³ The amendment specifically lists phosphate mining and processing wastes as wastes eligible for this Subtitle C regulatory flexibility.⁹⁴

Given RCRA’s mandates to protect public health and the environment from unreasonable risks of harm from hazardous waste, EPA may find strong support for decisionmaking that centers on environmental justice factors.⁹⁵

C. TSCA

TSCA directs EPA to evaluate new and existing chemicals and their risks to human health and the environment, and to then implement regulations to manage unacceptable risks, therefore preventing or reducing pollution caused by these substances before they enter the environment. Under TSCA, EPA has the authority to impose recordkeeping, reporting, and testing requirements upon manufacturers, and to develop restrictions relating to chemical substances⁹⁶ and mixtures.⁹⁷ Once a substance is evaluated for risk, if EPA determines the risk of injury to human health and the environment is unreasonable, EPA must propose regulations under §6(a) to remove the unreasonable risk.

Faced with a significant backlog in EPA’s evaluation and management of existing chemicals, the Frank R. Lautenberg Chemical Safety for the 21st Century Act of 2016 mandated EPA to evaluate existing chemicals for their risk of injury to human health and the environment, including a system of prioritization, with clear and enforceable deadlines. The amendment also directed EPA to conduct risk-based chemical evaluations without consideration of costs to the industry.

1. Prioritization Under §6

A high-priority substance is a chemical substance EPA determines *may* present an unreasonable risk of injury to health or the environment because of a *potential* hazard and a *potential* route of exposure under the “conditions of

use,” which include disposal.⁹⁸ EPA must prioritize and make risk of injury determinations without consideration of costs and include consideration of the risk to potentially exposed or susceptible subpopulations.⁹⁹

EPA notes that through the prioritization process, EPA is ultimately making a judgment as to whether or not a particular chemical substance warrants further assessment and ultimately a §6(b) risk evaluation as a high-priority substance.¹⁰⁰ It intends to select as high-priority chemicals those with the greatest hazard and exposure potential first.¹⁰¹ Low-priority substances are thus chemicals for which EPA has determined, based on sufficient information to establish and without consideration of costs or other non-risk factors, that a §6(b) risk evaluation is not warranted at the time of priority designation.¹⁰²

Once the prioritization process is initiated, EPA must publish a notice in the *Federal Register*, beginning a 90-day period during which interested persons may submit relevant information,¹⁰³ including information relevant to the following screening factors EPA will use to decide whether to propose designation as a high-priority or low-priority substance:

- (1) The chemical substance’s hazard and exposure potential;
- (2) The chemical substance’s persistence and bioaccumulation;
- (3) Potentially exposed or susceptible subpopulations;
- (4) Storage of the chemical substance near significant sources of drinking water;
- (5) The chemical substance’s conditions of use or significant changes in conditions of use;
- (6) The chemical substance’s production volume or significant changes in production volume; and
- (7) Other risk-based criteria that EPA determines to be relevant to the designation of the chemical substance’s priority.¹⁰⁴

After conducting the screening review, EPA must then propose to list the chemical as either a high-priority or low-priority substance, and the proposed designation is subject to another 90-day public comment period.¹⁰⁵ A final high-priority designation is only appropriate after EPA initiates prioritization and the close of the second 90-day comment period. The entire prioritization process may take nine to 12 months from the date of the first publication of the notice of initiation of prioritization.¹⁰⁶

93. 42 U.S.C. §6924.

94. *Id.* §6924(x).

95. Rachael Salcido, *Retooling Environmental Justice*, 39 UCLA J. ENV’T L. & POL’Y 1, 24 (2021).

96. “The term ‘chemical substance’ means any organic or inorganic substance of a particular molecular identity, including—(i) any combination of such substances occurring in whole or in part as a result of a chemical reaction or occurring in nature, and (ii) any element or uncombined radical.” 15 U.S.C. §2602(2).

97. “The term ‘mixture’ means any combination of two or more chemical substances if the combination does not occur in nature and is not, in whole or in part, the result of a chemical reaction. . . .” *Id.* §2602(10).

98. 40 C.F.R. §702.3 (2020).

99. *Id.*

100. Procedures for Prioritization of Chemicals for Risk Evaluation Under Toxic Substances Control Act; Final Rule, 82 Fed. Reg. 33753 (July 20, 2017); 40 C.F.R. §702 (2020).

101. 40 C.F.R. §702.5(a) (2020).

102. *Id.* §702.3.

103. *Id.* §702.7(d).

104. *Id.* §702.9(a).

105. *Id.* §702.9.

106. *Id.* §702.1(d).

Once a substance is designated as a high-priority substance, a risk evaluation is initiated and EPA has three years, subject to a possible one-time extension of six months, to complete the evaluation and make a final determination of risk.¹⁰⁷ For substances that EPA has determined pose an unreasonable risk, EPA has one year, extendable by up to two years, to propose a rule under §6(a) where EPA takes action to manage or minimize the risk so that it is no longer unreasonable. Such action can include, among others, a ban, limitation on quantities produced, or regulation governing disposal.¹⁰⁸

2. Testing Rules Under §4

To facilitate the policy that “adequate information should be developed with respect to the effect of chemical substances and mixtures on health and the environment and that the development of such information should be the responsibility of those who manufacture and those who process such chemical substances and mixtures,”¹⁰⁹ TSCA requires EPA to direct testing on a chemical substance or mixture if it finds the following criteria are met:

(I) the manufacture, distribution in commerce, processing, use, or disposal of a chemical substance or mixture, or that any combination of such activities, may present an unreasonable risk of injury to health or the environment,

(II) there is insufficient information and experience upon which the effects of such manufacture, distribution in commerce, processing, use, or disposal of such substance or mixture or of any combination of such activities on health or the environment can reasonably be determined or predicted, and

(III) testing . . . is necessary to develop such information¹¹⁰

D. The CAA

The purpose of CAA §112(a) is to control air emissions from any hazardous air pollutant that “causes or contributes to air pollution which may reasonably be anticipated to result in an increase in mortality or an increase in serious irreversible or incapacitating illness.”¹¹¹ In 1977, Congress amended the CAA after finding:

It is clear that exposure to radioactive materials can cause serious harm to health, including cancer, genetic damage, and birth deformities. Materials that are radioactive may remain so for thousands of years. This longevity poses a special problem for living organisms. Furthermore, expo-

sure to radioactivity are cumulative, that is, each new or additional exposure increases the risk of serious illness.¹¹²

In 1979, EPA issued a determination that radionuclides should be regulated as a hazardous air pollutant under §112 of the CAA because they are a known cause of cancer and genetic damage and present a risk warranting regulation under §112.¹¹³ Following a lawsuit to enforce §7412(b) (1)(B), which required EPA to issue proposed regulations within 180 days,¹¹⁴ in 1983, EPA proposed standards regulating radionuclide emissions from elemental phosphorus plants, but explicitly not from other sources in the phosphate industry.¹¹⁵

In 1984, EPA withdrew the proposed emission standards for elemental phosphorus plants, asserting that the public was already protected from exposure to radionuclides with an ample margin of safety, and reaffirmed its decision to not regulate other aspects of the phosphate industry.¹¹⁶ In 1985,¹¹⁷ EPA promulgated standards for radionuclide emissions from phosphorus plants,¹¹⁸ which was challenged by conservation and industry groups. In 1987, following a U.S. Court of Appeals for the District of Columbia (D.C.) Circuit decision (*Vinyl Chloride* case) that EPA improperly considered cost and technological feasibility of regulating vinyl chloride without first deciding based exclusively on risk to health,¹¹⁹ EPA voluntarily remanded its elemental phosphorus plants standards decision.¹²⁰

The *Vinyl Chloride* case established that to make a determination under §112, EPA must first determine a “safe” or “acceptable” level of risk considering only health-related factors, and next must set a standard that provides an “ample margin of safety” in which costs, feasibility, and other relevant factors may be considered.¹²¹ In 1989, EPA again determined that radiation causes cancer, hereditary effects, and developmental effects on fetuses; that numerous studies have demonstrated radiation is a carcinogen; that it is assumed that there is no completely risk-free level of exposure of radiation for cancer; and that its initial evaluation of radionuclides in 1979 was correct. EPA accordingly proposed listing radionuclides for regulation under

107. *Id.* §702.49.

108. 15 U.S.C. §2605(a).

109. *Id.* §2601(b)(1).

110. *Id.* §2603(a)(1)(A)(i).

111. 42 U.S.C. §7412.

112. H.R. REP. NO. 95-294, at 36-37, reprinted in 1977 U.S.C.C.A.N. 1077, 1114-15.

113. National Emission Standards for Hazardous Air Pollutants; Addition of Radionuclides to List of Hazardous Air Pollutants, 44 Fed. Reg. 76738 (Dec. 27, 1979).

114. *Sierra Club v. Gorsuch*, 551 F. Supp. 785, 13 ELR 20231 (N.D. Cal. 1982).

115. National Emission Standards for Hazardous Air Pollutants; Standards for Radionuclides, 48 Fed. Reg. 15076 (Apr. 6, 1983).

116. National Emission Standards for Hazardous Air Pollutants; Regulation of Radionuclides, 49 Fed. Reg. 43906 (Oct. 31, 1984).

117. *Sierra Club v. Ruckelshaus*, 602 F. Supp. 892, 15 ELR 20080 (N.D. Cal. 1984).

118. National Emission Standards for Hazardous Air Pollutants; Standard for Radon-222 Emissions From Underground Uranium Mines, 50 Fed. Reg. 7280 (Feb. 21, 1985).

119. *Natural Res. Def. Council v. Environmental Prot. Agency*, 824 F.2d 1211, 17 ELR 21100 (D.C. Cir. 1987).

120. National Emission Standards for Hazardous Air Pollutants; Regulation of Radionuclides, 54 Fed. Reg. 9612 (Mar. 7, 1989).

121. *Natural Res. Def. Council v. Environmental Prot. Agency*, 824 F.2d 1211, 17 ELR 21100 (D.C. Cir. 1987).

§112.¹²² Later that year, EPA finalized the rule for emissions of radionuclides from elemental phosphorus plants and phosphogypsum stacks.¹²³

While the CAA does not specifically dictate environmental justice considerations, it does require agency decisionmaking that considers levels of risk to communities, albeit with an allowance for weighing technological and economic factors.¹²⁴

E. NEPA

NEPA is “our basic national charter for protection of the environment.”¹²⁵ Congress enacted NEPA with the ambitious objectives of “encourag[ing] productive and enjoyable harmony between man and his environment . . . promot[ing] efforts which will prevent or eliminate damage to the environment and biosphere and stimulating the health and welfare of man; and enrich[ing] the understanding of the ecological systems and natural resources important to the Nation”¹²⁶ Further,

NEPA has twin aims. First, it places upon an agency the obligation to consider every significant aspect of the environmental impact of a proposed action, and to consider reasonable alternatives that could mitigate those impacts. Second, it ensures that the agency will inform the public that it has indeed considered environmental concerns in its decisionmaking process.¹²⁷

NEPA mandates several “action forcing” procedures—most importantly, the requirement to prepare an environmental impact statement (EIS) on major federal actions “significantly affecting the quality of the human environment.”¹²⁸ The term “human environment” is to be interpreted comprehensively to include the natural and physical environment and “the relationship of people with that environment.”¹²⁹ The CEQ regulations, which are binding on all federal agencies, explain, “When an environmental impact statement is prepared and economic or social and natural or physical environmental effects are interrelated, then the environmental impact statement will discuss all of these effects on the human environment.”¹³⁰

An EIS must detail “the environmental impact of the proposed action,” “any adverse environmental effects which cannot be avoided,” and any reasonable alternatives.¹³¹ It must analyze not only the direct impacts of a proposed

action, but also its indirect and cumulative impacts.¹³² “Indirect effects” are “caused by the action and are later in time or farther removed in distance, but are still reasonably foreseeable.”¹³³ A “cumulative effect” is the impact on the environment “which results from the incremental impact of the action when added to other past, present, and reasonably foreseeable future actions.”¹³⁴ This ensures “environmental information is available to public officials and citizens *before* decisions are made and *before* actions are taken.”¹³⁵ Because the information presented “must be of high quality, . . . [a]ccurate scientific analysis . . . and public scrutiny are essential to implementing NEPA.”¹³⁶

The preparation of an EIS does not terminate an agency’s duties under NEPA. NEPA requires that an agency “shall” supplement an EIS when the “agency makes substantial changes in the proposed action,” *or* “significant new circumstances or information” arise that are relevant to the environmental impacts of the action.¹³⁷ Underlying all of NEPA’s procedural requirements is the mandate that agencies take a “hard look” at all of the environmental impacts and risks of a proposed action. This hard look must include an analysis of environmental justice impacts.¹³⁸

The NEPA process provides the clearest avenue for agency decisionmaking that incorporates environmental justice considerations.¹³⁹ CEQ’s guidance to federal agencies on incorporating environmental justice considerations in decisionmaking explains that they are to be considered at every stage.¹⁴⁰ For example in the scoping stage, the action agency should develop a strategy for seeking input from low-wealth and BIPOC communities in the area and should substantively address concerns raised by those communities.¹⁴¹ The CEQ guidance states that participation

132. 40 C.F.R. §§1502.16, 1508.7, 1508.8 (2020).

133. *Id.* §1508.8(b).

134. *Id.* §1508.7. “[A]ssessment of a given environmental impact must occur as soon as that impact is ‘reasonably foreseeable.’” N.M. ex rel. Richardson v. Bureau of Land Mgmt., 565 F.3d 683, 716, 39 ELR 20101 (10th Cir. 2009) (citing 40 C.F.R. §1502.22); *see also* Kern v. Bureau of Land Mgmt., 284 F.3d 1062, 1072, 32 ELR 20571 (9th Cir. 2002) (“NEPA is not designed to postpone analysis of an environmental consequence to the last possible moment. Rather, it is designed to require such analysis as soon as it can reasonably be done.”).

135. 40 C.F.R. §1500.1(b) (2020) (emphasis added).

136. *Id.*

137. *Id.* §1502.9(c)(1)(i)-(iii).

138. *See* Standing Rock Sioux Tribe v. U.S. Army Corps of Eng’rs, 255 F. Supp. 3d 101, 140, 47 ELR 20035 (D.D.C. 2017) (holding agency’s “bare-bones” environmental justice analysis concluding that tribe would not be disproportionately harmed violated NEPA’s hard look requirement); *see also* Sierra Club v. Federal Energy Regul. Comm’n, 867 F.3d 1357, 1369, 47 ELR 20104 (D.C. Cir. 2017) (upholding EIS that fully discussed disproportionate impacts on environmental justice communities while recognizing that plaintiffs “[p]erhaps would have a stronger claim if the agency had refused entirely to discuss the demographics of the populations that will feel the pipelines’ effects”).

139. Alan Ramo, *Environmental Justice as an Essential Tool in Environmental Review Statutes: A New Look at Federal Policies and Civil Rights Protections and California’s Recent Initiatives*, 19 HASTINGS W.-NW. J. ENV’T L. & POL’Y 41, 52-56 (2013).

140. CEQ, ENVIRONMENTAL JUSTICE: GUIDANCE UNDER THE NATIONAL ENVIRONMENTAL POLICY ACT 10, 12 (1997), https://www.epa.gov/sites/default/files/2015-02/documents/ej_guidance_nepa_ceq1297.pdf.

141. *Id.* at 10-11.

122. 54 Fed. Reg. at 9615.

123. Phosphogypsum is the waste byproduct of wet-process phosphoric acid production, the intermediate feedstock of granular and liquid ammonium phosphate fertilizers. U.S. GEOLOGICAL SURVEY, *supra* note 8.

124. Salcido, *supra* note 95, at 24.

125. 40 C.F.R. §1500.1(a) (2020).

126. 42 U.S.C. §4321.

127. *Baltimore Gas & Elec. Co. v. Natural Res. Def. Council*, 462 U.S. 87, 97, 13 ELR 20544 (1983) (citation omitted).

128. *Robertson v. Methow Valley Citizen Council*, 490 U.S. 332, 348, 19 ELR 20743 (1989); 42 U.S.C. §4332(2)(C).

129. 40 C.F.R. §1508.14 (2020).

130. *Id.*

131. 42 U.S.C. §4332(2)(C).

from these communities is “necessary” for the “full consideration” of the project and alternatives.¹⁴²

The action agency should also analyze and explain whether the project will have a “disproportionately high and adverse human health or environmental impact” on BIPOC or low-wealth communities.¹⁴³ Where the project will cause impacts, the action agency should consider those impacts in its analysis and identification of the “environmentally preferable alternative” in the record of decision, and describe efforts to minimize and mitigate them.¹⁴⁴ EPA’s Guidance for Incorporating Environmental Justice Concerns in EPA’s NEPA Compliance Analyses goes further, requiring enhanced outreach efforts to BIPOC and low-wealth communities as well as an enhanced analysis to identify and assess impacts.¹⁴⁵

The D.C. Circuit has held that “section 111 of the Clean Air Act, properly construed, requires the functional equivalent of a NEPA impact statement.”¹⁴⁶ Courts applying other sections of the CAA and other statutes EPA implements have likewise held that while EPA is not required to comply with NEPA as an “environmentally protective regulatory agency,” it is required to provide the functional equivalent to NEPA. Notably, even where there is no statutory requirement to prepare an EIS or environmental assessment (EA), like with the CAA’s functional equivalent, agencies should still meet their obligations to consider the environmental justice impacts of their actions and “augment their procedures as appropriate to ensure that the otherwise applicable process or procedure for a federal action addresses environmental justice concerns.”¹⁴⁷

III. Regulatory History of Phosphogypsum Stacks

Despite EPA’s acknowledgment of the need for comprehensive federal phosphogypsum stack regulation since at least 1984, the fertilizer industry has enjoyed relative freedom from regulation of many of the legal frameworks it is theoretically subject to.¹⁴⁸ The most significant form of regulation came when EPA reevaluated the need for radionuclide emission standards under the CAA, after preliminary risk assessments indicated individual lifetime risks of cancer from exposure to radon emissions from existing stacks were as high as eight in 10,000 and that population risks were on the order of one fatal cancer per year.¹⁴⁹

Citing concern that radium-rich phosphogypsum would be incorporated into other products and diffused throughout the country such that EPA would be unable to ensure phosphogypsum radon emissions do not present an unacceptable risk to public health, EPA promulgated a national emission standards for hazardous air pollutants (NESHAP) rule in the form of a work practice standard that required all phosphogypsum be disposed into stacks or old phosphate mines.¹⁵⁰ EPA found that in order to control the dispersion of phosphogypsum and the resultant release of radon gas (a decay product of radium-226 found in phosphogypsum) to ambient air, the phosphogypsum, once created, must be disposed in stacks such that the radon emission is limited to a level of 20 picocuries per square meter per second (pCi/m²-s).¹⁵¹ The 1989 rule also found that, if dispersed throughout the country, phosphogypsum would present a public health threat from radon gas emissions that would continue for generations given radium-226’s 1,600-year half-life, and that it would be impracticable for EPA to implement regulation of such numerous and diffuse sources.¹⁵²

The rule also limited radon emissions from stacks to a flux of 20 pCi/m²-s, but EPA acknowledged that both the stack requirement and the numerical radon flux emission standard imposed on the stacks were simply a maintenance of the status quo, as phosphogypsum stacks were already standard industry practice, and the NESHAP rule imposed no additional control technology since EPA believed all existing stacks already met the numerical radon flux standard.¹⁵³ In other words, EPA did nothing to manage or reduce the measured risk of fatal cancer from radon exposure that at the time applied to 95 million people living within 80 kilometers of a stack.¹⁵⁴ Testing to demonstrate compliance with the flux standard need only be measured one time once a stack becomes inactive. If the standard is met, it never needs to be tested again.¹⁵⁵ Since then, EPA has only become less consistent and firm in its regulation of phosphogypsum.

A. EPA’s Determination of Unacceptable Level of Risk to Public Health

Shortly following EPA’s 1989 final rule, The Fertilizer Institute (TFI) and others petitioned EPA under 42 U.S.C. §7607(d)(7)(B) to reconsider the portion of the regulation (Subpart R) that requires disposal of phosphogypsum in stacks, arguing the regulation prevented other uses of phosphogypsum.¹⁵⁶ Industry argued the rule was adopted with-

142. *Id.* at 12.

143. *Id.* at 15.

144. *Id.* at 15-16.

145. U.S. EPA, GUIDANCE FOR INCORPORATING ENVIRONMENTAL JUSTICE CONCERNS IN EPA’S NEPA COMPLIANCE ANALYSES (1998), https://www.epa.gov/sites/default/files/2014-08/documents/ej_guidance_nepa_epa0498.pdf.

146. *Portland Cement Ass’n v. Ruckelshaus*, 486 F.2d 375, 384-85, 3 ELR 20642 (D.C. Cir. 1973).

147. CEQ, *supra* note 140, at 17.

148. Withdrawal of Proposed Standards, National Emission Standards for Hazardous Air Pollutants; Regulation of Radionuclides, 49 Fed. Reg. 43906, 43914 (Oct. 31, 1984).

149. *Id.*

150. An old phosphate mine receiving phosphogypsum waste would then also become a “phosphogypsum stack” for the purposes of the NESHAP. National Emission Standards for Hazardous Air Pollutants; Radionuclides; Final Rule and Notice of Reconsideration, 54 Fed. Reg. 51654, 51675 (Dec. 15, 1989).

151. *Id.*

152. *Id.*

153. *Id.*

154. *Id.*

155. *Id.*

156. NESHAPS for Radionuclides Reconsideration; Phosphogypsum, 55 Fed. Reg. 13480 (Apr. 10, 1990).

out proper notice and comment, was contrary to a national policy favoring recycling, prevented beneficial uses, would cause irreparable harm to farmers, was arbitrary and capricious because it prevented the sale of phosphogypsum for industrial processes, and that it was possible to make phosphogypsum radon gas emissions safe.¹⁵⁷ EPA granted limited reconsideration to receive more information on (1) specific types of proposed alternative uses; (2) current and anticipated feasibility of those uses; (3) research and development of processes that remove radium from phosphogypsum; (4) health risks associated with those uses; (5) the availability, cost, and effectiveness of substitutes for phosphogypsum; and (6) the proper definition of phosphogypsum regarding its radium content.¹⁵⁸ It also established a 60-day public comment period and a public hearing.¹⁵⁹

In 1992, in response to TFI's petition for reconsideration, EPA finalized national emission standards for radon emissions from phosphogypsum stacks approving the use of phosphogypsum in agriculture at 10 pCi per gram (pCi/g) and limited research and development with no more than 700 pounds of phosphogypsum. However, EPA found that "regardless of the radium-226 concentration, the use of phosphogypsum in road construction always resulted in a MIR [maximum individual risk] significantly greater than the presumptive safe level. . . . Therefore, *EPA has determined that the use of phosphogypsum in road construction presents an unacceptable level of risk to public health.*"¹⁶⁰

EPA also found that phosphogypsum "contains appreciable quantities of radium-226, uranium, and other uranium decay products . . . The radionuclides of significance are uranium-238, uranium-234, thorium-230, radon-222, lead-210, [and] polonium-210,"¹⁶¹ and that these toxins can be resuspended into the air by wind and vehicular traffic.¹⁶² It found that "[t]race metals may also be leached from phosphogypsum, as are radionuclides, and migrate to nearby surfaces and groundwater resources,"¹⁶³ that chromium and arsenic may also pose a significant health risk,¹⁶⁴ and that a "number of potential constituents in phosphogypsum from some facilities . . . [may] cause adverse effects or the restriction of potential uses of nearby surface or groundwater resources" such as arsenic, lead, cadmium, chromium, fluoride, zinc, antimony, and copper.¹⁶⁵

EPA concluded that "the level of risk presented by a particular application depends not only upon the radium-226 concentration in the phosphogypsum, but also the nature of the application, the exposure scenario, the exposure pathway, the amount of phosphogypsum used, and other factors" and that "for road construction applications, even

at radium-226 concentrations 3 pCi/g, the risk to the maximum exposed individual is well above the acceptable level."¹⁶⁶ EPA also determined that, besides certain restricted uses for agriculture and research, "other uses of phosphogypsum will be prohibited without prior EPA approval," approval that would be reviewed on a case-by-case basis "only if EPA finds that the proposed use of phosphogypsum will be at least as protective of public health in the short and long term as disposal in a stack or mine."¹⁶⁷

EPA established a process to consider other uses of phosphogypsum for approval. It requires an application that includes a description of the proposed use, handling, processing, and location of the facility; the quantity of phosphogypsum to be used by each facility; the average concentration of radium-226 in the phosphogypsum to be used; a description of measures to prevent the uncontrolled release of phosphogypsum into the environment; an estimate of the MIR, risk distribution, and incidence associated with the proposed use; and the intended disposition of any unused phosphogypsum.¹⁶⁸ In 1994, EPA increased the permitted distribution of phosphogypsum to up to 7,000 pounds at a time for research and development activities.

On October 15, 2019, TFI, on behalf of its members that own or operate phosphogypsum stacks, petitioned EPA to approve the removal of phosphogypsum from stacks for use in road construction under 40 C.F.R. §61.206.¹⁶⁹ On April 7, 2020, TFI submitted a revised request for approval for use of phosphogypsum in federal, state, and local departments of transportation or public works.¹⁷⁰ Specifically, the request was for EPA to grant a blanket approval, in advance, for the use of phosphogypsum containing up to an average of 35 pCi/g in road base, paving, and various combinations of road base and paving in any government roadway projects that are (1) authorized by federal, state, or local departments of transportation or public works; and (2) conducted as part of a government road project using appropriate road construction standards.

TFI's risk assessment purported to evaluate gamma radiation and phosphogypsum dust from no more than 50% of the roadbed material by weight and no more than 2.25% of road surface material by weight,¹⁷¹ and asserted the risk of fatal cancer in various exposure scenarios for road construction workers to be 0.5 in 10,000, road users 0.1 in 10,000, truck drivers of phosphogypsum for road construction 0.5 in 10,000, residents 0.08 in 10,000, and utility workers 0.004 in 10,000.¹⁷² It also included an

157. *Id.*

158. *Id.* at 13480, 13482.

159. *Id.* at 13482.

160. National Emission Standards for Hazardous Air Pollutants; National Emissions Standards for Radon Emissions From Phosphogypsum Stacks, 57 Fed. Reg. 23305 (June 3, 1992) (emphasis added).

161. U.S. EPA, POTENTIAL USES OF PHOSPHOGYPSUM AND ASSOCIATED RISK: BACKGROUND INFORMATION DOCUMENT (1992).

162. *Id.*

163. *Id.* at 2-8.

164. *Id.*

165. *Id.*

166. 57 Fed. Reg. at 23305.

167. *Id.*

168. *Id.*

169. Letter from Andrew Wheeler, Administrator, U.S. EPA, to Corey Rosenbusch, President and Chief Executive Officer, TFI 2 (Oct. 14, 2020) [hereinafter Wheeler Letter].

170. It appears one major difference between the two requests is that the October 2019 petition requested a waiver that phosphogypsum be placed in stacks, whereas the revised petition's request is narrower asking that phosphogypsum under 35 pCi/g be used for road construction.

171. ARCADIS, RADIOLOGICAL RISK ASSESSMENT IN SUPPORT OF PETITION FOR BENEFICIAL USE OF PHOSPHOGYPSUM app. 2 at ES-2 (2019); Wheeler Letter, *supra* note 169, at 4.

172. ARCADIS, *supra* note 171, at ES-2; Wheeler Letter, *supra* note 169, at 3.

“Extreme Hypothetical ‘Reclaimer Exposure Scenario,’” in which it described the future scenario where a road breaks down or is broken down and a house is constructed on top of it. TFI’s “reclaimer exposure scenario” presumed customary construction methods for a house on grade and calculated risk of fatal cancer at 0.4 in 10,000.¹⁷³

In its 1992 rule, EPA estimated the lifetime risk in the reclaimer scenario from external radiation, dust inhalation, and ingestion of food for 30 years of exposure to be 3.5 in 1,000 (35 in 10,000), far outside the acceptable level of risk.¹⁷⁴ In response to TFI’s 2020 request, EPA retained SC&A, Inc. as its expert reviewer. SC&A determined TFI’s consultant, Arcadis, used modeling that was inappropriate and recommended that EPA request TFI revise its reclaimer radon exposure dose calculation “using more realistic (i.e., less optimistic) parameter values, or provide additional justification for the values”.¹⁷⁵ Instead, EPA stated that:

though likely an underestimation of the dose and risk to a future resident of a house built on a site of an abandoned road built with phosphogypsum, the TFI risk assessment does show that risk to a future resident of the site might be acceptable depending on the methods used to construct the house,¹⁷⁶

and accordingly,

that the risk to members of the public in the future is not above the acceptable risk, the redevelopment of any abandoned roads as anything other than a road constructed in accordance with this risk assessment should not be undertaken until an additional site-specific risk assessment demonstrates that risks to members of the public are acceptable.¹⁷⁷

EPA stated it “remains concerned” about potential exposure should the road become abandoned, particularly for residences built on road material containing phosphogypsum, and “does not agree that TFI’s assumptions in its analysis of this scenario . . . could be relied upon to limit the potential risks to a future residential individual from such an occurrence.”¹⁷⁸ EPA determined “this risk can be acceptably mitigated by including appropriate terms and conditions in the approval.” EPA stated that roads constructed with phosphogypsum may not be abandoned or used for other non-road purposes, and that any phosphogypsum removed from the stack but not used must

be returned to the stack.¹⁷⁹ EPA “questioned some of the modeling assumptions used by TFI to generate the estimate of the reclaimer . . . but based on new information and analysis in the revised request now concludes that risks associated with the reclaimer scenario can be addressed with conditions.”¹⁸⁰

The request does not include information required by 40 C.F.R. §61.206(b)(3)-(5) and (10), regarding where the ultimate requested use will take place, including the roads or intermediary locations, or how much phosphogypsum will be used at each facility.¹⁸¹ EPA nonetheless concludes that given “the nature of the request and the conditions” imposed, that required information “is not essential to making the determination of whether the proposed use of PG [phosphogypsum] would be at least as protective of public health as stacking.”¹⁸² These conditions are (1) the average radium-226 content of phosphogypsum to be used in a road base or pavement must not exceed 35 pCi/g; (2) pavement may contain no more than 2.25% phosphogypsum by weight; (3) road base may contain no more than 50% phosphogypsum by weight; (4) road base containing phosphogypsum may consist of one lift of up to 25 cm-depth and not extend beyond paved areas of the road; and (5) a minimum 50-foot setback from the edge of the road to inhabited structures.¹⁸³

On December 18, 2020, conservation and public health organizations, joined by a major workers union, petitioned the D.C. Circuit to review EPA’s approval.¹⁸⁴ The same day, those same groups also directly petitioned EPA for reconsideration under CAA §307(d)(7)(B). On June 3, 2021, EPA withdrew, revoked, and rescinded its October 2020 approval of using phosphogypsum in roads because the petitioner did not provide the information required at 40 C.F.R. §61.206. EPA noted that its decision is without prejudice regarding any subsequent request that complies with 40 C.F.R. §61.206.

B. EPA’s Beville Amendment Analysis

After a series of lawsuits imposing a deadline and requiring EPA to narrow the scope of its Beville Amendment interpretation, EPA completed its study of phosphogypsum under RCRA and submitted the required report to Congress for 20 mineral processing special wastes, including phosphogypsum and process wastewater, in 1990.¹⁸⁵ The

173. ARCADIS, *supra* note 171, at 3-12, app. 1 at 10.

174. U.S. EPA, REVIEW OF THE RADIOLOGICAL RISK ASSESSMENT IN SUPPORT OF PETITION FOR BENEFICIAL USE OF PHOSPHOGYPSUM PREPARED FOR THE FERTILIZER INSTITUTE 17 (2020) (EPA-HQ-OAR-2020-0442).

175. SC&A, INC., TECHNICAL REVIEW OF THE FERTILIZER INSTITUTE RISK ASSESSMENT FOR ADDITIONAL USE OF PHOSPHOGYPSUM IN ROAD BASE 45 (2020).

176. *Id.* at 18.

177. *Id.* at 20.

178. 57 Fed. Reg. at 66552.

179. *Id.*

180. Wheeler Letter, *supra* note 169, at 5.

181. *Id.* at 3.

182. *Id.* at 4.

183. *Id.* at 7.

184. Center for Biological Diversity v. Environmental Prot. Agency, No. 20-1506 (D.C. Cir. Dec. 18, 2020). [Editor’s Note: Jaclyn Lopez represents the Center for Biological Diversity (and co-plaintiffs) in this case.]

185. *Concerned Citizens of Adamstown v. Environmental Protection Agency*, No. 84-3041 (D.D.C. Aug. 21, 1985), imposed the deadline; *Environmental Defense Fund v. Environmental Protection Agency (EDF II)*, 852 F.2d 1316, 18 ELR 21169 (D.C. Cir. 1988), held EPA can only apply the Beville exclusion to wastes generated in high volume with low toxicity, in accordance with EPA’s original “special waste” concept, as opposed to all mineral processing wastes. REPORT TO CONGRESS, *supra* note 10; Special Wastes From

study found widespread groundwater contamination at phosphogypsum stack sites, including contaminated off-site wells, the potential for drinking water source exposures, several documented damage cases that impacted both groundwater and surface waters and threatened and harmed aquatic life, increased air pathway cancer risk for those living near stacks, and varied and inadequate state regulation.¹⁸⁶ Constituents of most concern that present a hazard to human health include radionuclides, arsenic, chromium, selenium, cadmium, radium-226, lead, vanadium, copper, antimony, thallium, fluoride, and selenium.¹⁸⁷ The report also found an increased hazard and contaminant release potential should the industry expand in the absence of Subtitle C regulation.¹⁸⁸

Nevertheless, due to costs to the industry in complying with a Subtitle C program, EPA's determination published the following year exempted phosphogypsum and process wastewater (as well as all other special wastes) from Subtitle C regulation.¹⁸⁹ The determination promised a Subtitle D solid waste program with tailored minimum federal guidelines for 18 of the special wastes, and announced the development and future promulgation of a TSCA regulatory program for phosphogypsum and process wastewater.¹⁹⁰ EPA further stated it planned to use existing authorities under either RCRA §7003 or the Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA)¹⁹¹ §106 to address site-specific phosphogypsum and process wastewater groundwater contamination problems that pose substantial and imminent endangerment to human health or the environment.¹⁹²

As part of its development of a TSCA regulatory program, EPA chartered the Phosphoric Acid Waste Dialogue Committee under the Federal Advisory Committee Act in 1992 to determine whether TSCA could effectively regulate phosphoric acid wastes.¹⁹³ According to a later EPA report as part of EPA's 1998 Phase IV Land Disposal Restriction rulemaking, the dialogue committee could not identify any feasible in-plant process changes that would significantly reduce the volume and/or toxicity of phos-

phogypsum or phosphoric acid process wastewater.¹⁹⁴ The exact nature of the dialogue committee's activities, including which process changes were considered and what criteria were used to determine feasibility, remain unknown, as EPA has acknowledged that the dialogue committee's report is "missing" from its document collection, perhaps destroyed in a basement flood with no available duplicate copies.¹⁹⁵ Nevertheless, somehow finding that TSCA regulation would not be possible, EPA decided it would revisit the 1991 Bevill regulatory determination and determine whether RCRA Subtitle C regulation of phosphoric acid special wastes remained inappropriate.¹⁹⁶

Following the conclusion of the dialogue committee, EPA evaluated the environmental risks posed by phosphogypsum and process wastewater at 13 Florida sites by applying the RCRA National Corrective Action Prioritization System to each site.¹⁹⁷ The results showed that all 13 facilities evaluated had groundwater contamination and all 13 would qualify as "high priority."¹⁹⁸ Despite this, EPA to date has neither revisited its Bevill determination for phosphogypsum and process wastewater, nor initiated any rulemakings under TSCA concerning phosphogypsum and process wastewater.

C. U.S. Army Corps of Engineers' Refusal to Evaluate Impacts of Phosphogypsum

Between 2010 and 2011, the U.S. Army Corps of Engineers (the Corps) received four applications from phosphate companies for permits to dredge and fill 51,000 acres of wetlands, watersheds, and habitat across large areas of DeSoto, Hardee, Hillsborough, Manatee, and Polk, Counties in Florida to mine 823 million tons of phosphate rock for fertilizer production over the next few decades.¹⁹⁹ The Corps "determined that, when viewed collectively, the separate proposed phosphate mining projects have similarities that provide a basis for evaluating their direct, indirect, and cumulative environmental impacts in a single Area-wide Environmental Impact Statement."²⁰⁰

Despite numerous and repeated requests from EPA, local municipalities, and the general public, the Corps refused to analyze phosphogypsum, the reasonably foreseeable indirect effect of phosphate mining.²⁰¹ The applicant and

Mineral Processing (Mining Waste Exclusion); Final Regulatory Determination and Final Rule, 56 Fed. Reg. 27300 (June 13, 1991).

186. REPORT TO CONGRESS, *supra* note 10.

187. *Id.*

188. *Id.* Both the industry and the size of many stacks have indeed expanded since 1990.

189. Special Wastes From Mineral Processing (Mining Waste Exclusion); Final Regulatory Determination and Final Rule, 56 Fed. Reg. 27300 (June 13, 1991).

190. EPA has acknowledged Subtitle D does not contain effective enforcement and oversight tools that would be necessary to create such a program, but said it would work with Congress to obtain these authorities and would rely on the existing regulatory efforts of states to the extent possible. Regulatory Determination for Wastes From the Extraction and Beneficiation of Ores and Minerals, 51 Fed. Reg. 24496 (July 21, 1986). Just as it never created a phosphogypsum and process wastewater TSCA program, EPA never created the Subtitle D program for the other 18 mining processing special wastes.

191. 42 U.S.C. §§9601-9675, ELR STAT. CERCLA §§101-405.

192. Special Wastes From Mineral Processing (Mining Waste Exclusion); Final Regulatory Determination and Final Rule, 56 Fed. Reg. 27300 (June 13, 1991).

193. U.S. EPA, RISKS POSED BY BEVILL WASTES 7 (1997).

194. *Id.* at 7-8.

195. Personal Correspondence with EPA Docket Center, Arctic Slope Mission Services-Contractor, e-mail: doCKET-customerService@epa.gov (Sept. 16, 2020).

196. U.S. EPA, *supra* note 193, at 7.

197. *Id.*

198. *Id.*

199. Nancy J. Sticht, *Areawide Environmental Impact Statement Addressing Phosphate Mining in Central Florida Phosphate District Completed*, U.S. ARMY CORPS ENGINEERS JACKSONVILLE DISTRICT (May 9, 2013), <https://www.saj.usace.army.mil/Media/News-Stories/Article/479623/areawide-environmental-impact-statement-addressing-phosphate-mining-in-central/>.

200. U.S. ARMY CORPS OF ENGINEERS, FINAL ENVIRONMENTAL IMPACT STATEMENT EXECUTIVE SUMMARY (2013), https://www.saj.usace.army.mil/Portals/44/docs/regulatory/Items%20of%20Interest/Phosphate%20Mining/_Final%20AEIS%20ExecutiveSummary.pdf.

201. *Id.*

the Corps explicitly tied the application to dredge wetlands to mine phosphate to the applicant's fertilizer plants. In its permit application, the applicant averred the viability of its fertilizer plants "is dependent upon the ability to continue phosphate mining, which in turn depends on issuance of the pending 404 permit applications."²⁰²

Conservation groups filed a lawsuit challenging the Corps' failure to analyze the production and storage of phosphogypsum in its NEPA analysis.²⁰³ The plaintiffs argued the Corps violated NEPA and the Administrative Procedure Act by ignoring the indirect and cumulative environmental effects of phosphogypsum production and storage in its NEPA analysis. They argued that the applicant's production of phosphogypsum was the foreseeable result of mining phosphate ore that would not occur but for the permittee's mining practices,²⁰⁴ and that NEPA therefore demands that the Corps take a "hard look" at the significant effects of the phosphate mine and phosphogypsum, including the indirect and cumulative impacts.²⁰⁵ They argued that phosphogypsum production and storage would not occur but for the Corps' permitting, and, hence, are among the "indirect effects" of phosphate mining.²⁰⁶ They alleged the applicant operates its fertilizer plants near its mines, and many of the plants have been built on mined-out land.²⁰⁷ They argued that it was the fertilizer plants that actually met the Corps' stated "purpose and need" of the mines (i.e., to create fertilizer), and the plants also produce the radioactive phosphogypsum.²⁰⁸

Four appeals courts, including the D.C. Circuit, the U.S. Courts of Appeals for the Eighth Circuit, the U.S. Courts of Appeals for the Ninth Circuit, and the U.S. Courts of Appeals for the Tenth Circuit, had reached similar conclusions in cases involving mining approvals, directing federal agencies to consider downstream effects such as the transportation and processing of mined ore and the greenhouse gas emissions from mined coal. These courts and their lower district courts have consistently held that these types of downstream effects fall within the scope of indirect impacts that should be reviewed under NEPA as "reasonably foreseeable."

For example, in *Sierra Club v. Federal Energy Regulatory Commission (Sabal Trail)*, the D.C. Circuit held that the Federal Energy Regulatory Commission (FERC) violated NEPA by failing to analyze the burning of natural gas, a greenhouse gas, transported by the Sabal Trail natural gas pipeline, finding, "greenhouse-gas emissions are an indirect effect of authorizing this project, which FERC could reasonably foresee, and which the agency has legal authority to mitigate."²⁰⁹ In making this finding, the court reasoned:

It's not just the journey, though, it's also the destination. All the natural gas that will travel through these pipelines will be going somewhere: specifically, to power plants in Florida, some of which already exist, others of which are in the planning stages. Those power plants will burn the gas, generating both electricity and carbon dioxide. And once in the atmosphere, that carbon dioxide will add to the greenhouse effect, which the EIS describes as "the primary contributing factor" in global climate change.²¹⁰

Plaintiffs argued that like FERC in *Sabal Trail*, the Corps was charged with balancing "the public benefits against the adverse effects of the project" . . . including adverse environmental effects,²¹¹ and that like FERC, the Corps had the authority to condition or deny a permit "on the ground that [it] would be too harmful to the environment," making the agency the "legally relevant cause" of the direct and indirect environmental effects of the project it approves.²¹²

The Ninth Circuit had likewise held that downstream activities that affect the human environment should be considered indirect effects under NEPA. In *South Fork Band Council of West Shoshone of Nevada v. U.S. Department of the Interior*, the Ninth Circuit explained that "[t]he air quality impacts associated with transport and off-site processing of the five million tons of refractory ore are prime examples of indirect effects that NEPA requires be considered."²¹³ Applying this authority, many district courts in the Ninth Circuit have reached similar holdings.²¹⁴ The Tenth Circuit has also held that the downstream impacts of extractive activities must be analyzed as indirect effects under NEPA.

For instance, in *WildEarth Guardians v. U.S. Bureau of Land Management*, the Tenth Circuit concluded that an EIS unlawfully failed to review impacts from coal combustion emissions.²¹⁵ In *Colorado Environmental Coalition v.*

210. *Id.* at 1371.

211. *Id.* at 1373 (quoting *Minisink Residents for Env't Pres. & Safety v. Federal Energy Regul. Comm'n*, 762 F.3d 97, 101-02, 44 ELR 20190 (D.C. Cir. 2014)).

212. *Id.* at 1373, 1375 (holding that even though the power plants will be subject to "state and federal air permitting processes," "the existence of permit requirements overseen by another federal agency or state permitting authority cannot substitute for a proper NEPA analysis").

213. 588 F.3d 718, 725, 39 ELR 20276 (9th Cir. 2009) (finding the Bureau of Land Management failed to evaluate the environmental impacts of transporting and processing ore at a facility 70 miles away); *see also* *North Plains Res. Council, Inc. v. Surface Transp. Bd.*, 668 F.3d 1067, 1077-79 (9th Cir. 2011) (finding EIS for railroad line failed to review cumulative impacts from coal mine that would utilize the rail line).

214. *See, e.g., Montana Env't Info. Ctr. v. U.S. Office of Surface Mining*, 274 F. Supp. 3d 1074, 1090-99, 47 ELR 20101 (D. Mont. 2017) (finding EA for expansion of coal mine failed to take a hard look at the indirect and cumulative effects of coal transportation, coal combustion, and foreseeable greenhouse gas emissions); *WildEarth Guardians v. Office of Surface Mining, Reclamation & Enft.*, No. 14-103-BLG-SPW, 2015 U.S. Dist. LEXIS 145149, at **19-20 (D. Mont. Oct. 23, 2015) (finding the Office of Surface Mining's finding of no significant impact failed to take a hard look at environmental impacts including downstream greenhouse gas emissions from federal coal leasing), *report and recommendation adopted in part, rejected in part on other grounds*, 2016 U.S. Dist. LEXIS 7223 (D. Mont. Jan. 21, 2016).

215. 870 F.3d 1222, 1233-40, 47 ELR 20115 (10th Cir. 2017).

202. *Id.*

203. Complaint, *Center for Biological Diversity v. U.S. Army Corps of Eng'rs*, No. 8:17-cv-618 (M.D. Fla. Mar. 15, 2017) [hereinafter CBD complaint].

204. *Id.*

205. 40 C.F.R. §§1508.7, 1508.8, 1508.25(c) (2020).

206. CBD complaint, *supra* note 203.

207. *Id.*

208. *Id.*

209. 867 F.3d 1357, 1374, 47 ELR 20104 (D.C. Cir. 2017).

Office of Legacy Management, the U.S. District Court for the District of Colorado found an agency unlawfully failed to consider the indirect effects of processing ore that would be mined with agency-issued permits.²¹⁶ As in *Colorado Environmental Coalition*, the Corps here has failed to consider the indirect effects of processing the phosphate ore that would be mined with Corps-issued CWA permits.²¹⁷ The same is true for the Eighth Circuit.²¹⁸

The U.S. District Court for the Middle District of Florida determined “it was reasonable for the Corps to conclude that the environmental effects of phosphogypsum production and storage fell outside the scope of its NEPA review.”²¹⁹ Plaintiffs-appellants appealed to the U.S. Court of Appeals for the Eleventh Circuit.²²⁰ In a split decision authored by Judge John Rogers, the majority, over a strong dissent by Judge Beverly Martin, held that (1) “even if the Corps’ permit is a but-for cause of those effects, it is not a proximate—or legally relevant—cause”; (2) “because the Corps lacks the authority to regulate phosphogypsum wholesale, the ‘rule of reason’ instructs that the Corps need not consider its effects”; and (3) “the Corps’ scoping decision is consistent with its own regulations, the Corps’ interpretation of which is entitled to deference.”²²¹

Judge Martin dissented on the grounds that the ruling runs counter to *Public Citizen* and limitations on *Auer* deference, and eviscerates NEPA’s requirements insofar as they bear on the consideration of foreseeable indirect effects. However, as it stands, the Corps is not required to analyze, much less regulate, the phosphogypsum that results from the phosphate mining it authorizes.²²²

216. 819 F. Supp. 2d 1193, 1212 (D. Colo. 2011), *amended in part on other grounds by* No. 08-01624-WJM-MJW, 2012 U.S. Dist. LEXIS 24126 (D. Colo. Feb. 27, 2012).

217. *See also* *Sierra Club v. U.S. Dep’t of Energy*, 255 F. Supp. 2d 1177, 1185 (D. Colo. 2002) (holding agency must review impacts from “reasonably foreseeable” mine on private land when preparing NEPA document for federal land easement related to the future mine); *High Country Conservation Advocates v. U.S. Forest Serv.*, 52 F. Supp. 3d 1174, 1189-94, 44 ELR 20144 (D. Colo. 2014) (finding EIS for coal lease modification and mine expansion must consider downstream emissions from coal combustion); *Diné Citizens Against Ruining Our Env’t v. Office of Surface Mining, Reclamation & Enfr’t*, 82 F. Supp. 3d 1201 (D. Colo. 2015) (holding the agency improperly limited its scope of review by failing to assess the indirect and cumulative impacts of a coal mine expansion that would create an additional 12.7 million tons of coal combustion), *order vacated in part, appeal dismissed in part as moot by* 643 Fed. App’x 799 (10th Cir. 2016).

218. *Mid States Coal. for Progress v. Surface Transp. Bd.*, 345 F.3d 520, 548-50 (8th Cir. 2003) (holding that the agency was required to consider impacts from burning coal when reviewing a proposed railway access and transportation of the coal even though the power plants using the coal were hundreds of miles away).

219. *Center for Biological Diversity v. U.S. Army Corps of Eng’rs*, No. 8:17-cv-618-T-23MAP, 2017 U.S. Dist. LEXIS 205629 (M.D. Fla. Dec. 14, 2017). [Editor’s Note: Jaclyn Lopez represented the Center for Biological Diversity (and co-plaintiffs) in this case.]

220. *Center for Biological Diversity v. U.S. Army Corps of Eng’rs*, 941 F.3d 1288, 50 ELR 20176 (11th Cir. 2019). [Editor’s Note: Jaclyn Lopez represented the Center for Biological Diversity (and co-plaintiffs) in this case.]

221. *Id.* at 1294.

222. *Id.* at 1306-15.

IV. Environmental Justice Demands EPA Regulate Phosphogypsum

There have been numerous documented phosphogypsum stack failures throughout the United States. Even phosphogypsum stacks that do not have massive, unpermitted failures routinely violate their permit conditions. As a result, phosphogypsum and process wastewater are hazardous wastes that present a substantial risk to the environment and nearby communities. Unfortunately, these phosphogypsum stacks are near vulnerable communities and sensitive environments. EPA must regulate phosphogypsum and process wastewater as hazardous under RCRA and regulate them as high-priority chemical substances under TSCA.

A. Phosphogypsum and Process Wastewater Are Hazardous Wastes

While the Bevill Amendment only requires one study and report to Congress for each special waste,²²³ nothing precludes EPA from conducting additional study or revisiting the initial determination at a later date when more information about the present and potential hazard becomes known. Indeed, EPA has repeatedly acknowledged its authority to reverse its Bevill determination, starting with the notice publishing the determination itself: “If information obtained or findings developed . . . are such that RCRA could better handle this matter, the Agency *will revisit today’s regulatory determination*, and determine whether subtitle C regulation of the phosphoric acid special wastes remains inappropriate.”²²⁴

EPA next suggested it would revisit its Bevill regulatory determinations for certain “high-risk” mining wastes in a 1997 rulemaking on various mining waste issues. EPA cited concern about “environmental and natural resource damages from acid mine drainage, the use of cyanide and other toxic chemicals, radioactivity, stability of tailings and waste rock piles, and in-situ mining methods.”²²⁵

In 2010, after a breach in an impoundment pond at the Tennessee Valley Authority’s Kingston, Tennessee, power plant released 1.1 billion gallons of coal ash slurry, EPA revisited its May 2000 Bevill determination excluding coal combustion residuals (CCR) from Subtitle C requirements. EPA proposed a reversal of its Bevill determination and regulation under Subtitle C, or, in the alternative, minimum federal standards under Subtitle D.²²⁶ Multiple,

223. *See Solite Corp. v. Environmental Prot. Agency*, 952 F.2d 473, 22 ELR 20376 (D.C. Cir. 1991).

224. *Special Wastes From Mineral Processing (Mining Waste Exclusion); Final Regulatory Determination and Final Rule*, 56 Fed. Reg. 27300, 27316 (June 13, 1991) (emphasis added).

225. *Second Supplemental Proposal on Treatment Standards for Metal Wastes and Mineral Processing Wastes, Mineral Processing and Bevill Exclusion Issues, and the Use of Hazardous Waste as Fill; Proposed Rule*, 62 Fed. Reg. 26041, 26054 (May 12, 1997) (“the Agency is therefore seeking comment on whether reexamination of some Bevill wastes is warranted”).

226. *Hazardous and Solid Waste Management System; Identification and Listing of Special Wastes; Disposal of Coal Combustion Residuals From Electric*

similar large-volume releases have occurred in the phosphoric acid production waste context since EPA's 1991 Bevill regulatory determination.

Further, RCRA and its implementing regulations are designed to *prevent* harm caused by solid and hazardous wastes, and to adequately protect human health and the environment by ensuring these wastes are properly managed and disposed of in the first place. EPA cannot continue to ignore this mandate by pointing to authority to enforce corrective action cleanup or abatement orders after the harm has already occurred (i.e., remediation of site-specific groundwater contamination) under a higher imminent and substantial endangerment standard. EPA must ensure proper management and disposal of phosphogypsum and process wastewater under RCRA Subtitle C by reversing its Bevill determination and listing the wastes as hazardous before looking to future corrective actions, as said corrective actions would not be necessary if the waste were properly and safely managed.

RCRA regulations provide that a solid waste not excluded from regulation as a hazardous waste may be designated as a listed "toxic waste" (hazardous waste with toxic constituent(s)) or a "characteristic hazardous waste."²²⁷ The solid waste may be listed as a toxic waste if (1) it contains a toxic constituent listed in Appendix VIII to 40 C.F.R. §261 and (2) an analysis of 11 enumerated factors supports a conclusion that the waste is "capable of posing a substantial present or potential hazard to human health or the environment when improperly treated, stored, transported or disposed of, or otherwise managed."²²⁸ A "characteristic hazardous waste" must exhibit one of the four following hazardous waste characteristics: ignitability, corrosivity (as determined by pH), reactivity, or toxicity (as determined by a leaching test).²²⁹

Long-term exposure to fine particulate matter also adversely affects the respiratory and cardiovascular systems and otherwise increases mortality risk.²³⁰ For instance, particulate matter exposure is associated with an increased risk of COVID-19 death in the United States, with an increase of only 1 microgram per cubic meter ($\mu\text{g}/\text{m}^3$) associated with an 8% increase in the COVID-19 death rate.²³¹ Phosphogypsum contains toxic constituents, including particulate matter, and as such is capable of posing substantial hazards. Process wastewater also exhibits the character-

istics of corrosivity and toxicity, satisfying the criteria for designation as a characteristic hazardous waste as well.²³²

1. Phosphogypsum Stacks Contain Toxic Constituents

Active phosphogypsum stacks are entirely uncovered, open-air dumps. Even inactive portions of active stacks can remain uncovered until stack closure, when a vegetated cover is finally installed.²³³ Phosphogypsum stacks with a soil cover of just 0.5 m of dirt would emit less radon ($6 \text{ pCi}/\text{m}^2\text{-s}$) than the current management practice of no soil cover (up to $20 \text{ pCi}/\text{m}^2\text{-s}$).²³⁴ EPA has already concluded that phosphogypsum stacks pose a considerable air pathway cancer risk as a result of radon emissions.²³⁵ In addition, disturbed phosphogypsum (e.g., construction vehicles driving over the stacks and removing the crust) and wind erosion cause fugitive dust emissions.²³⁶ These dust emissions provide an inhalation pathway for toxic constituents within phosphogypsum particles, including arsenic, chromium, and radionuclides.²³⁷ Combining the risk from radon inhalation from the stacks themselves with the risks of radionuclide, arsenic, and chromium-containing particle inhalation, EPA estimated a total air pathway lifetime maximally exposed individual cancer risk of approximately 9×10^{-5} .²³⁸

Phosphogypsum leachate contains the following toxic constituents listed in Appendix VIII to 40 C.F.R. §261: arsenic, lead, nickel, cadmium, chromium, silver, antimony, copper, mercury, and thallium,²³⁹ with concentrations of arsenic and chromium in phosphogypsum solids also exceeding EPA's health-based screening criteria in 1990.²⁴⁰ Despite high migration potential of contaminants within phosphogypsum and process water, neither is treated to remove impurities like radionuclides or heavy metals either while active or at time of closure. Process water is only treated by double-liming,²⁴¹ or in some cases

Utilities, Proposed Rule, 75 Fed. Reg. 35127 (June 21, 2010). The final rule adopted the Subtitle D minimum standards option, deferring a final Bevill regulatory determination "until additional information . . . needed to quantify the risks of CCR disposal, . . . the potential impacts of recent Agency regulations on the chemical composition of CCR, [and] the adequacy of the state programs" is available. Hazardous and Solid Waste Management System; Disposal of Coal Combustion Residuals From Electric Utilities, Final Rule, 80 Fed. Reg. 21302, 21309 (Apr. 17, 2015).

227. 40 C.F.R. §261 (2020).

228. *Id.* §261.11.

229. *Id.* §§261.20-.24.

230. XIAO WU ET AL., HARVARD CHAN SCHOOL OF PUBLIC HEALTH, EXPOSURE TO AIR POLLUTION AND COVID-19 MORTALITY IN THE UNITED STATES: A NATIONWIDE CROSS-SECTIONAL STUDY (2020) (preprinted), <https://www.medrxiv.org/content/medrxiv/early/2020/04/27/2020.04.05.20054502.full.pdf>.

231. *Id.*

232. In addition to satisfying listing criteria for a toxic waste, some phosphogypsum samples from Rock Springs, Wyoming, also exhibited the toxicity characteristic for chromium in 1990 using the extraction procedure (EP) leach test. REPORT TO CONGRESS, *supra* note 10, at 12-3 to 12-4. The EP has since been replaced by the toxicity characteristic leaching procedure (TCLP). 40 C.F.R. §261.24(a) (2020).

233. FLA. ADMIN. CODE r. 62-673.610 (2013).

234. National Emission Standards for Hazardous Air Pollutants; National Emissions Standards for Radon Emissions From Phosphogypsum Stacks; Final Rule, 54 Fed. Reg. 51654, 51676 (Dec. 19, 1989).

235. REPORT TO CONGRESS, *supra* note 10, at 12-17.

236. *Id.* In some parts of the country, fugitive dust emissions from wind erosion occur even without phosphogypsum disturbance. For example, in Idaho, phosphogypsum stacks have a sandy consistency that do not crust over due to the type of phosphate ore and beneficiation process used prior to phosphoric acid production. Idaho stacks also do not receive the same level of dust suppression influenced by rainfall as stacks in the subtropical Southeast. THOMAS HORTON, U.S. EPA, A PRELIMINARY RADIOLOGICAL ASSESSMENT OF RADON EXHALATION FROM PHOSPHATE GYPSUM PILES AND INACTIVE URANIUM MILL TAILINGS PILES 2 (1979).

237. HORTON, *supra* note 236.

238. *Id.*

239. REPORT TO CONGRESS, *supra* note 10, at 12-8.

240. *Id.*

241. *Id.* at 12-24.

reverse osmosis, when release is necessary to maintain surge capacity or to prevent an uncontrolled release.²⁴²

□ **Arsenic.** Arsenic is a protoplasmic poison causing malfunctioning of cell respiration, cell enzymes, and mitosis.²⁴³ Several studies have noted an association between chronic exposure to high levels of arsenic and lung cancer in occupationally exposed subpopulations.²⁴⁴ Prolonged ingestion of water contaminated with arsenic may result in the manifestations of toxicity in practically all systems of the human body.²⁴⁵ Chronic oral exposure to inorganic arsenic causes a pattern of skin changes associated with changes in the blood vessels of the skin, including patches of darkened skin and the appearance of small “corns” or “warts” on the palms, soles, and torso.²⁴⁶ Ingesting arsenic has been reported to increase the risk of cancer in the skin, liver, bladder, and lungs, and the U.S. Department of Health and Human Services has determined that inorganic arsenic is known to be a human carcinogen.²⁴⁷

□ **Lead.** Toxic effects of chronic lead exposure have been observed in every human organ system that has been rigorously studied.²⁴⁸ Adverse neurological, renal, cardiovascular, hematological, immunological, reproductive, and developmental effects, especially in children, have been observed at low measured blood levels (PbB) of less than 5 µg per day (µg/d).²⁴⁹ The Centers for Disease Control and Prevention states that “no safe blood lead level in children has been identified.”²⁵⁰ The Department of Health and Human Services classifies lead and lead compounds as reasonably anticipated to be human carcinogens and lead has long been recognized as a poison to living organisms,²⁵¹ with negative effects on general health, reproduction, and behavior.²⁵²

Lead was highlighted as an important cause of mortality in wildlife populations in the late 1950s when ingestion of spent hunting lead pellets was recognized to cause death

in a wide range of wild waterfowl.²⁵³ Reports of poisoned wildlife have continued frequently since that time.²⁵⁴ Various authors have attempted to define tissue concentrations in birds indicative of excessive lead exposure, sublethal poisoning, and acute poisoning,²⁵⁵ but there is no definitive consensus on “background” lead levels for wild birds. Long-lived animals are particularly susceptible to bioaccumulation of lead in bone tissues, and repeated lead ingestion and accumulation in long-lived species can reduce bone mineralization, which could mean an increase in bone fragility.²⁵⁶

□ **Nickel.** In nickel-sensitized individuals representing approximately 10%-20% of the general population, dermal contact with a small amount of nickel or oral exposure to fairly low doses of nickel can result in dermatitis.²⁵⁷ Occupational exposure to airborne nickel has caused chronic bronchitis, reduced lung function, and cancer of the lung and nasal sinus.²⁵⁸ The Department of Health and Human Services has determined that metallic nickel may reasonably be anticipated to be a human carcinogen.²⁵⁹

□ **Cadmium.** Long-term exposure to cadmium through air, water, soil, and food leads to cancer and organ system toxicity such as skeletal, urinary, reproductive, cardiovascular, central and peripheral nervous, and respiratory systems.²⁶⁰ Breathing air with very high levels of cadmium can severely damage the lungs, and may cause death.²⁶¹ Chronic exposure to low levels of cadmium in the air results in a buildup of cadmium in the kidneys and may result in kidney disease.²⁶² Damage to the lungs and nasal cavity has been ob-

242. Bill Perpich Jr. et al., *Mobile Wastewater Treatment Helps Remediate Concentrated Acidic Process Water at Fertilizer Plant*, FLA. WATER RES. J., July 2005, at 24, https://www.fwrj.com/TechArticle05/0705%20FWRJ_tech%201.pdf.

243. Monisha Jaishankar et al., *Toxicity, Mechanism, and Health Effects of Some Heavy Metals*, 7 INTERDISC. TOXICOLOGY 60 (2014), <https://www.ncbi.nlm.nih.gov/pmc/articles/PMC4427717/>.

244. James P. Hughes et al., *Evaluation and Synthesis of Health Effects Studies of Communities Surrounding Arsenic Producing Industries*, 17 INT'L J. EPIDEMIOLOGY 407 (1988), <https://pubmed.ncbi.nlm.nih.gov/3042651/>.

245. Ranjit N. Ratnaike, *Acute and Chronic Arsenic Toxicity*, 79 POSTGRADUATE MED. J. 391 (2003), <https://pmj.bmj.com/content/postgrad-medj/79/933/391.full.pdf>.

246. AGENCY FOR TOXIC SUBSTANCES AND DISEASE REGISTRY, U.S. DEPARTMENT OF HEALTH AND HUMAN SERVICES, TOXICOLOGICAL PROFILE FOR ARSENIC (2007), <https://www.atsdr.cdc.gov/toxprofiles/tp2.pdf>.

247. *Id.*

248. AGENCY FOR TOXIC SUBSTANCES AND DISEASE REGISTRY, U.S. DEPARTMENT OF HEALTH AND HUMAN SERVICES, TOXICOLOGICAL PROFILE FOR LEAD 4 (2020), <https://www.atsdr.cdc.gov/toxprofiles/tp13.pdf>.

249. *Id.* at 3.

250. *Id.*

251. George B. Grinnell, *Lead Poisoning*, 42 FOREST & STREAM 117 (1894); J.E. Engstad, *Foreign Bodies in the Appendix*, 15 MINN. MED. 603 (1932); Bayard T. Horton, *Bird Shot in Vermiform Appendix: A Cause of Chronic Appendicitis*, 13 SURGICAL CLINICS N. AM. 1005 (1933).

252. M. Douglas Ris et al., *Early Exposure to Lead and Neuropsychological Outcome in Adolescence*, 10 J. INT'L NEUROPSYCHOLOGICAL SOC'Y 261 (2004).

253. Frank C. Bellrose, *Lead Poisoning as a Mortality Factor in Waterfowl Populations*, 27 ILL. NAT. HIST. SURV. BULL. 235 (1959).

254. F.Y. Bates et al., *Lead Toxicosis in Mallard Ducks*, 4 BULL. WILDLIFE DISEASE ASS'N 116 (1968); GLEN C. SANDERSON & FRANK C. BELLROSE, A REVIEW OF THE PROBLEM OF LEAD POISONING IN WATERFOWL (Illinois Natural History Survey, Special Publication No. 4, 1986); James C. Irwin & Lars H. Karstad, *The Toxicity for Ducks of Disintegrated Lead Shot in a Simulated-Marsh Environment*, 8 J. WILDLIFE DISEASES 149 (1972); Janet L. Kramer & Patrick T. Redig, *Sixteen Years of Lead Poisoning in Eagles, 1980-95: An Epizootiologic View*, 31 J. RAPTOR RSCH. 327 (1997); Anton M. Scheuhammer & S.L. Norris, *The Ecotoxicology of Lead Shot and Lead Fishing Weights*, 5 ECOTOXICOLOGY 279 (1996).

255. J. Christian Franson et al., *A Retrospective Study of Postmortem Findings in Red-Tailed Hawks*, 30 J. RAPTOR RSCH. 7 (1996); Deborah J. Pain, *Lead in Waterfowl*, in ENVIRONMENTAL CONTAMINANTS IN WILDLIFE: INTERPRETING TISSUE CONCENTRATIONS 251 (W.M. Beyer et al. eds., CRC Press 1996).

256. Laura Gangoso et al., *Long-Term Effects of Lead Poisoning on Bone Mineralization in Vultures Exposed to Ammunition Sources*, 57 ENV'T POLLUTION 569 (2009).

257. AGENCY FOR TOXIC SUBSTANCES AND DISEASE REGISTRY, U.S. DEPARTMENT OF HEALTH AND HUMAN SERVICES, TOXICOLOGICAL PROFILE FOR NICKEL 7 (2005), <https://www.atsdr.cdc.gov/toxprofiles/tp15.pdf>.

258. *Id.*

259. *Id.* at 6.

260. Mehrdad Rafati Rahimzadeh et al., *Cadmium Toxicity and Treatment: An Update*, 8 CASPIAN J. INTERNAL MED. 135 (2017), <https://www.ncbi.nlm.nih.gov/pmc/articles/PMC5596182>.

261. AGENCY FOR TOXIC SUBSTANCES AND DISEASE REGISTRY, U.S. DEPARTMENT OF HEALTH AND HUMAN SERVICES, TOXICOLOGICAL PROFILE FOR CADMIUM 4 (2012), <https://www.atsdr.cdc.gov/toxprofiles/tp5.pdf> [hereinafter TOXICOLOGICAL PROFILE FOR CADMIUM].

262. *Id.*

served in animals exposed to cadmium in the air.²⁶³ Lung cancer has been found in some studies of workers exposed to cadmium in the air and studies of rats that breathed in cadmium.²⁶⁴ Eating food or drinking water with very high cadmium levels severely irritates the stomach, leading to vomiting and diarrhea, and sometimes death.²⁶⁵

Chronic ingestion of cadmium can lead to a buildup of cadmium in the kidneys and kidney disease.²⁶⁶ Chronic exposure to low levels of cadmium can also cause bones to become fragile and break easily.²⁶⁷ Animal studies indicate that the young are more susceptible than adults to a loss of bone and decreased bone strength from exposure to cadmium.²⁶⁸ Kidney and bone effects have also been observed in laboratory animals ingesting cadmium, as well as anemia, liver disease, and nerve or brain damage.²⁶⁹ The Department of Health and Human Services has determined that cadmium and cadmium compounds are known human carcinogens.²⁷⁰

Cadmium is toxic and has no biological function in living organisms.²⁷¹ It causes both acute and sublethal effects, and is toxic at low concentrations to plants, fish, birds, mammals (including humans), and microorganisms.²⁷² In a 2005 study that compared acute toxicity of 63 heavy metals to a widespread crustacean found in both fresh and brackish water (*Hyalella azteca*), cadmium was the most toxic.²⁷³ It bioaccumulates in all levels of the food chain in both aquatic and terrestrial organisms.²⁷⁴

❑ **Chromium.** The primary effects associated with exposure to chromium(VI) compounds are respiratory, gastrointestinal, immunological, hematological, reproductive, and developmental, while the primary effects associated with exposure to chromium(III) compounds are on the respiratory and immunological systems.²⁷⁵ Numerous epidemiological studies recognizing the association between chromium inhalation and lung cancer have been published since the 1940s.²⁷⁶ The International Agency for Research on Cancer has determined that chromium(VI)

compounds are carcinogenic to humans.²⁷⁷ Both chromium and arsenic, which exceeded EPA's health-based screening criteria for phosphogypsum solids in 1990, bioaccumulate in aquatic species.²⁷⁸

❑ **Silver.** Silver compounds can cause some areas of the skin and other body tissues to turn gray or blue-gray, a permanent condition known as "argyria."²⁷⁹ Argyria occurs in people who eat or breathe in silver compounds over a long period of several months to years.²⁸⁰ Exposure to dust containing relatively high levels of silver compounds may cause breathing problems, lung and throat irritation, and stomach pain.²⁸¹

❑ **Antimony.** Electrocardiogram alterations were found in about 50% of the workers exposed to antimony compounds.²⁸² Other health effects that have been observed in animals orally exposed to higher doses of antimony include hepatocellular vacuolization, hematological alterations including decreases in red blood cell counts and hemoglobin levels, and histological alterations in the thyroid.²⁸³

❑ **Copper.** Long-term exposure to copper dust can irritate the nose, mouth, and eyes, and cause headaches, dizziness, nausea, and diarrhea.²⁸⁴ Water that contains higher than normal levels of copper may cause vomiting, stomach cramps, or diarrhea.²⁸⁵ Intentionally high intakes of copper can cause liver and kidney damage and even death.²⁸⁶

❑ **Mercury.** The nervous system is highly sensitive to mercury.²⁸⁷ Some people who ate fish contaminated with large amounts of methylmercury or seed grains treated with methylmercury or other organic mercury compounds developed permanent damage to the brain and kidneys.²⁸⁸ Permanent damage to the brain has also been shown to occur from exposure to sufficiently high levels of metallic mercury.²⁸⁹ The kidneys are also sensitive to the effects of mercury, because mercury accumulates in the kidneys and causes higher exposures to these tissues, and thus more

263. *Id.*

264. *Id.* at 5.

265. *Id.*

266. *Id.*

267. *Id.*

268. *Id.* at 6.

269. *Id.* at 5.

270. *Id.*

271. STUART M. LEVIT, A LITERATURE REVIEW OF EFFECTS OF CADMIUM ON FISH 2 (2010), <https://www.conservationgateway.org/ConservationByGeography/NorthAmerica/UnitedStates/alaska/sw/cpa/Documents/L2010CadmiumLR122010.pdf>.

272. *Id.*

273. Uwe Borgmann et al., *Toxicity of Sixty-Three Metals and Metalloids to Hyalella Azteca at Two Levels of Water Hardness*, 24 ENV'T TOXICOLOGY & CHEMISTRY 641 (2005).

274. TOXICOLOGICAL PROFILE FOR CADMIUM, *supra* note 261.

275. AGENCY FOR TOXIC SUBSTANCES AND DISEASE REGISTRY, U.S. DEPARTMENT OF HEALTH AND HUMAN SERVICES, TOXICOLOGICAL PROFILE FOR CHROMIUM (2012), <https://www.atsdr.cdc.gov/toxprofiles/tp7.pdf> [hereinafter TOXICOLOGICAL PROFILE FOR CHROMIUM].

276. A.D. Dayan & Alan J. Paine, *Mechanisms of Chromium Toxicity, Carcinogenicity, and Allergenicity: Review of the Literature From 1985 to 2000*, 20 HUM. & EXPERIMENTAL TOXICOLOGY 439 (2001), <https://journals.sagepub.com/doi/pdf/10.1191/096032701682693062>.

277. TOXICOLOGICAL PROFILE FOR CHROMIUM, *supra* note 275, at 4.

278. Valerie Canivet et al., *Toxicity and Bioaccumulation of Arsenic and Chromium in Epigeal and Hypogeal Freshwater Macroinvertebrates*, 40 ARCHIVES ENV'T CONTAMINATION & TOXICOLOGY 345 (2001), <https://link.springer.com/article/10.1007/s002440010182>.

279. AGENCY FOR TOXIC SUBSTANCES AND DISEASE REGISTRY, U.S. PUBLIC HEALTH SERVICE, TOXICOLOGICAL PROFILE FOR SILVER (1990), <https://www.atsdr.cdc.gov/toxprofiles/tp146.pdf>.

280. *Id.*

281. *Id.*

282. AGENCY FOR TOXIC SUBSTANCES AND DISEASE REGISTRY, U.S. DEPARTMENT OF HEALTH AND HUMAN SERVICES, TOXICOLOGICAL PROFILE FOR ANTIMONY AND COMPOUNDS (2019), <https://www.atsdr.cdc.gov/toxprofiles/tp23.pdf>.

283. *Id.*

284. AGENCY FOR TOXIC SUBSTANCES AND DISEASE REGISTRY, U.S. DEPARTMENT OF HEALTH AND HUMAN SERVICES, TOXICOLOGICAL PROFILE FOR COPPER 6 (2004), <https://www.atsdr.cdc.gov/ToxProfiles/tp132.pdf>.

285. *Id.*

286. *Id.* at 7.

287. AGENCY FOR TOXIC SUBSTANCES AND DISEASE REGISTRY, U.S. DEPARTMENT OF HEALTH AND HUMAN SERVICES, TOXICOLOGICAL PROFILE FOR MERCURY (1999), <https://www.atsdr.cdc.gov/toxprofiles/tp46.pdf>.

288. *Id.*

289. *Id.*

USCA Case #25-1087 Document #2105058
 damage.²⁹⁰ All forms of mercury can cause kidney damage if large enough amounts enter the body.²⁹¹

□ **Thallium.** Thallium can affect the human nervous system, lung, heart, liver, and kidney if large amounts are eaten or drunk for short periods of time.²⁹² Temporary hair loss, vomiting, and diarrhea can also occur, and death may result after exposure to large amounts of thallium for short periods. Thallium can be fatal from a dose as low as 1 g.²⁹³ The Agency for Toxic Substances and Disease Registry reports no information was found on health effects in humans after exposure to smaller amounts of thallium for longer periods.²⁹⁴ As in humans, animal studies indicate that exposure to large amounts of thallium for brief periods of time can damage the nervous system and heart and can cause death.²⁹⁵ Animal reproductive organs, especially the testes, are damaged after drinking small amounts of thallium-contaminated water for two months.²⁹⁶

The concentrations of these toxic constituents vary from stack to stack according to the source phosphate ore processed. Concentrations of chromium and arsenic exceeded EPA's health-based risk screening criteria for inhalation in the 1990 study, meaning these constituents could pose a significant (i.e., greater than 1×10^{-5}) risk if phosphogypsum were released to the ambient air as particles.²⁹⁷ Concentrations of arsenic also exceeded EPA's health-based risk screening criteria for ingestion.²⁹⁸

Process wastewater also exhibits the corrosivity and toxicity characteristics. Process wastewater is measured with pH values typically lower than 2, and as extreme as 0.5 (battery acid has a pH of around 1).²⁹⁹ Concentrations of cadmium, chromium, and selenium in process wastewater exceeded extraction procedure (EP) regulatory levels in 1990.³⁰⁰ And all of the toxic constituents in phosphogypsum are metals or other inorganics that do not degrade.³⁰¹

Moreover, the metal and nonmetal ions in phosphogypsum are highly mobile when leached due to the acidity of process water, indicating a strong potential for groundwater contamination.³⁰² Heavy metals are persistent in the environment.³⁰³ Once groundwaters in karst geological terrains like those in Florida are contaminated with toxic phosphogypsum constituents by large-scale pollution events like sinkholes forming within a phosphogypsum

Filed: 03/10/2025 Page 449 of 472
 stack, they are difficult if not impossible to remediate due to uncertainty in the fate and transport of contaminants after sinkhole collapse,³⁰⁴ and a need for a better understanding of karst processes and characterization of fast-moving conduit flow patterns.

2. Phosphogypsum and Process Wastewater Pose a Substantial Hazard to Human Health or the Environment

Phosphogypsum and process wastewater presently pose a substantial hazard to human health or the environment as a result of improper treatment, storage, and disposal. In addition to containing toxic, heavy metals, phosphogypsum and process wastewater are radioactive. Phosphogypsum has very high levels of gross alpha and beta radiation (10 to 100 pCi/g) relative to levels in typical soils (approximately 1 pCi/g). Radium-226 concentrations in U.S. phosphogypsum samples have measured as high as 49 pCi/g. EPA has repeatedly compared phosphogypsum stacks to uranium mill tailing impoundments in both size and radiation exposure. Yet, uranium byproduct materials are managed under standards—in place since 1983—that are identical to Subtitle C standards for hazardous waste treatment, storage, and disposal facilities, while state-managed phosphogypsum stack designs, according to EPA, do not even “approach the protectiveness of the uranium mill tailings standards.”³⁰⁵

Sanjay Sahu et al. found that phosphate ore processing and disposal of phosphogypsum contributes to enhanced levels of natural radionuclides and heavy metals in the environment, and that the resulting environmental impact should be considered carefully to ensure safety.³⁰⁶ They found that gypstacks can cause serious environmental contamination of soils, water, and the atmosphere through gypstack erosion and the release of heavy metals, sulphates, fluorosilicates, hydrogen fluorides, phosphorus, cadmium, and radium-226.

Alicja Boryło and Bogdan Skwarzec found elevated levels of metals in plants nearby phosphogypsum stacks, some higher than permissible levels in food.³⁰⁷ They calculated that the factor contamination for the plants were 2.1 for lead, 3.7 for zinc, 2.8 for nickel, and 3.2 for iron for green parts, to 11.8 for lead, 12.2 for zinc, 9.4 for nickel, and 5.5

290. *Id.*

291. *Id.*

292. AGENCY FOR TOXIC SUBSTANCES AND DISEASE REGISTRY, U.S. PUBLIC HEALTH SERVICE, TOXICOLOGICAL PROFILE FOR THALLIUM (1992), <https://www.atsdr.cdc.gov/toxprofiles/tp54.pdf>.

293. *Id.*

294. *Id.*

295. *Id.*

296. *Id.*

297. REPORT TO CONGRESS, *supra* note 10, at 12-7.

298. *Id.*

299. *Id.* at 12-58.

300. The EP test has since been replaced by the more rigorous TCLP test. 40 C.F.R. §261.24(a) (2020).

301. REPORT TO CONGRESS, *supra* note 10, at 12-1.

302. Carter et al., *supra* note 21.

303. Hazrat Ali et al., *Environmental Chemistry and Ecotoxicology of Hazardous Heavy Metals: Environmental Persistence, Toxicity, and Bioaccumulation*, 2019 J. CHEMISTRY art. 6730305, <https://www.hindawi.com/journals/jchem/2019/6730305/>.

304. Daljit Sandu et al., *Fate and Transport of Radioactive Gypsum Stack Water Entering the Floridan Aquifer Due to a Sinkhole Collapse*, 8 SCI. REP. art. 11439 (2018), <https://www.nature.com/articles/s41598-018-29541-0>. Daljit Sandu, Implications of Groundwater Plume Transport and Analysis of Karst Aquifer Characteristics in Central Florida (2019) (Ph.D. dissertation, University of Central Florida), <http://purl.fcla.edu/fcla/etd/CFE0007723>.

305. U.S. EPA, OFFICE OF SOLID WASTE, FEASIBILITY ANALYSIS: A COMPARISON OF PHOSPHOGYPSUM AND URANIUM MILL TAILING WASTE UNIT DESIGNS 26 (1997).

306. Sanjay K. Sahu et al., *Natural Radioactivity Assessment of a Phosphate Fertilizer Plant Area*, 7 J. RADIATION RSCH. & APPLIED SCI. 123 (2014).

307. Alicja Boryło & Bogdan Skwarzec, *Bioaccumulation of Polonium (²¹⁰Po) and Uranium (²³⁴U, ²³⁸U) in Plants Around Phosphogypsum Waste Heap in Wiślinka (Northern Poland)*, 99 RADIOCHIMICA ACTA 719 (2011), <https://www.degruyter.com/document/doi/10.1524/ract.2011.1872/html>.

for iron in the roots near phosphogypsum stacks in comparison to non-contaminated plants. They concluded that the subject gypstack may pose a health risk to the local population through consumption of the vegetables.

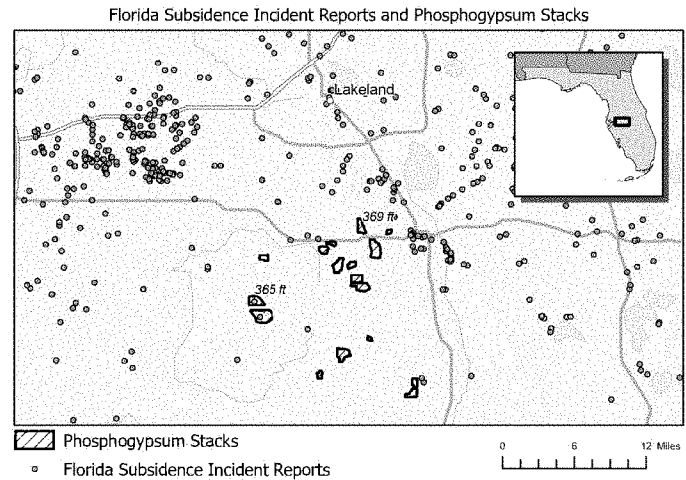
Boryło et al. found elevated levels of polonium and lead in soil near a phosphogypsum stack.³⁰⁸ They theorized that heavy rainfall for a long time may cause infiltration of radionuclides from phosphogypsum stacks to nearby soils and waterways. Lina Al Attar et al. found elevated levels of fluoride in air and soil sampling near phosphogypsum stacks.³⁰⁹ Eduardo Da Silva et al. found that where phosphate was mined and processed (where phosphogypsum was created) cadmium was enriched 105-208 times and uranium was enriched 18-44 times.³¹⁰ That study also found a general trend of an increase in heavy metals content with decreasing particle size.

On June 24, 2021, conservation groups filed a lawsuit against Florida Gov. Ron DeSantis, the FDEP, HRK Holdings, and the Manatee Port Authority, alleging that Piney Point “presents an imminent and substantial endangerment to Floridians’ lives, health, and environment”³¹¹ after the FDEP authorized the discharge of process wastewater into Tampa Bay to avert a catastrophic failure of the phosphogypsum stack. On August 5, 2021, the FDEP likewise filed a complaint against the owner of Piney Point requesting a court-appointed receiver.³¹² A few weeks later, a judge approved an order appointing a receiver over Piney Point following a motion for an emergency hearing, citing “HRK’s continuing failure in its duty to ensure adequate water management by providing sufficient storage capacity at the Site to prevent flooding, overtopping of lined areas, and uncontrolled or untreated discharges.”³¹³

Phosphogypsum stack mismanagement is not only plausible, but numerous documented damage cases have already occurred. Phosphogypsum stacks are built in sinkhole-prone areas atop drinking water sources (see Figure 1). These gypstacks are lined by a single high-density polyethylene liner, which often tears, allowing the acidic process water to penetrate the phosphogypsum stack.

Since EPA’s Bevill determination, there have been three reported major sinkholes underneath phosphogypsum stacks, releasing millions of gallons of untreated process wastewater and an undetermined amount of phosphogypsum into the Floridan aquifer: the 1994 sinkhole beneath a stack at the New Wales facility in Mulberry, releasing

Figure 1. Florida Subsidence Incident Reports and Phosphogypsum Stacks



Source: Map generated from ArcGIS, *Find a Phosphogypsum Stack Near You*, <https://center.maps.arcgis.com/apps/View/index.html?appid=a0cc8cbe12ea4ff9831822243b360766> (last visited Dec. 21, 2021).

80 million gallons of process wastewater³¹⁴; the 2009 sinkhole beneath a phosphogypsum stack at the PCS facility in White Springs, releasing 84 million gallons of process wastewater³¹⁵; and, most recently, the 2016 sinkhole beneath a phosphogypsum stack just 1.25 miles away from the 1994 original sinkhole at the New Wales facility in Mulberry, releasing 215 million gallons of process wastewater.³¹⁶ Despite the proven geological instability of the area, the FDEP recently issued a permit to expand the New Wales phosphogypsum stack facility by more than 230 acres.³¹⁷ A few days later, seismic monitoring of surface conditions at the south phosphogypsum stack led the FDEP to conclude “the presence of a subsurface condition that has the potential to adversely affect the integrity of the phosphogypsum stack.”³¹⁸

All states containing phosphogypsum stacks have adopted the federal exclusion from hazardous waste regulations, and therefore do not require double liners with double leachate detection and collection systems above and between the liners. While Florida’s Phosphogypsum Management Rule now requires stacks to be lined with a single composite liner, the state of Florida allowed phosphate to be deposited in unlined stacks until March 25, 2001.³¹⁹ Louisiana considers phosphogypsum stacks to be solid waste landfills and has no regulations specific to phospho-

308. Alicja Boryło et al., *A Study on Lead (²¹⁰Pb) and Polonium (²¹⁰Po) Contamination From Phosphogypsum in the Environment of Wiślinka (Northern Poland)*, 15 ENV’T SCI.: PROCESSES & IMPACTS 1622 (2013).

309. Lina Al Attar et al., *Case Study: Heavy Metals and Fluoride Contents in the Materials of Syrian Phosphate Industry and in the Vicinity of Phosphogypsum Piles*, 33 ENV’T TECH. 143 (2012).

310. Eduardo F. Da Silva et al., *Heavy Elements in the Phosphorite From Kalaat Khasba Mine (North-Western Tunisia): Potential Implications on the Environment and Human Health*, 182 J. HAZARDOUS MATERIALS 232 (2010).

311. Complaint at 1, *Center for Biological Diversity v. DeSantis*, No. 8:21-cv-1521 (M.D. Fla. June 24, 2021).

312. *Florida Dep’t of Env’t Prot. v. HRK Holdings, LLC*, No. 2021-CA-003192-AX (Fla. 12th Cir. Ct. Aug. 5, 2021).

313. *Fortress 2020 Landco, LLC v. HRK Holdings, LLC*, No. 2020-CA-004459-AX (Fla. 12th Cir. Ct. Aug. 25, 2021).

314. James Marshall, *Mountains of Waste Menace Florida’s “Swiss Cheese” Aquifers*, E&E NEWS (Apr. 9, 2020), <https://www.eenews.net/stories/1062576963>.

315. *Id.*

316. *Id.*

317. Permit No. FL0036421 (issued Oct. 15, 2021).

318. Letter from the FDEP to Mosaic Fertilizer, LLC, Re: Subsurface Activity Early Detection System Non-Routine Report Notification New Wales Facility—South Phosphogypsum Stack Wastewater/NPDES Facility ID No. FL0036421 (Oct. 21, 2021); *Expansion Paused: Seismic Activity Detected at Mosaic New Wales*, 10 TAMPA BAY (Oct. 29, 2021), <https://www.wtsp.com/article/news/local/polckounty/mosaic-gypsum-stack-seismic-activity/67-da4b496d-07b9-4c1a-9e44-af8dcd7cf19>.

319. FLA. ADMIN. CODE R. 62-673.440 (1993).

gypsum stacks, except that the regulatory authority may give “special consideration” to phosphogypsum stacks and waive or modify requirements, including the operation of liners and leachate collection and removal systems applicable to any other solid waste landfill.³²⁰

These single liners are designed to leak and discharge water to underlying groundwater, creating a permitted “zone of discharge” in Florida.³²¹ Idaho does not currently apply any solid waste requirements to phosphogypsum stacks, but Idaho’s Department of Environmental Quality is undergoing rulemaking for the design, construction, and management of phosphogypsum stacks and lateral expansions.³²² Mississippi, North Carolina, Texas, and Wyoming have no solid waste regulations specific to phosphogypsum stacks.³²³

3. Phosphogypsum Stacks Are Near Vulnerable Communities and Sensitive Environments

Systemic and pervasive racism in America has resulted in significant environmental injustices affecting the health of vulnerable communities.³²⁴ Air pollution is of particular concern as low-wealth and BIPOC communities live nearer to urban sources of pollution than other segments of society.³²⁵ Phosphogypsum stacks produce radon, a radioactive gas. Radon exposure is the second leading cause of lung cancer in the United States behind cigarette smoking, killing 15,000-22,000 people per year.³²⁶

There is no known safe level of exposure to radon,³²⁷ but to control the dispersion of phosphogypsum and the resultant release of radon gas (a decay product of radium-226 found in phosphogypsum) to ambient air, EPA mandates that once created, phosphogypsum must be disposed in stacks such that the radon emission is limited to a level of 20 pCi/m²-s.³²⁸ This method of disposal is the least bad option, for if dispersed throughout the country, phospho-

gypsum would present a public health threat from radon gas emissions that would continue for generations given radium-226’s 1,600-year half-life; and it would be impracticable if not impossible for EPA to implement regulation of such numerous and diffuse sources.³²⁹

In 1992, EPA finalized its national emission standards for radon emissions from phosphogypsum stacks, finding that “regardless of the radium-226 concentration, the use of phosphogypsum in road construction always resulted in a MIR significantly greater than the presumptive safe level. . . . Therefore, EPA has determined that the use of phosphogypsum in road construction presents an unacceptable level of risk to public health.”³³⁰ EPA also found that phosphogypsum “contains appreciable quantities of radium-226, uranium, and other uranium decay products The radionuclides of significance are uranium-238, uranium-234, thorium-230, radon-222, lead-210, [and] polonium-210,”³³¹ and that these toxins can be resuspended into the air by wind and vehicular traffic. It found that trace metals may also be leached from phosphogypsum, as are radionuclides, and migrate to nearby surfaces and groundwater resources, that chromium and arsenic may also pose a significant health risk, and that a “number of potential constituents in phosphogypsum from some facilities . . . may cause adverse effects or restrictions of potential uses of nearby surface and groundwater resources” such as arsenic, lead, cadmium, chromium, fluoride, zinc, antimony, and copper.³³²

Many of the nation’s 70 phosphogypsum stacks are near low-wealth and BIPOC communities (see Figures 2-4). Some of these communities are also vulnerable to sea-level rise. And some appear to be built on weak soils, further threatening nearby residents and the environment. Several phosphogypsum stack owners have gone bankrupt, leaving the communities and local governments to fend for themselves.

The proximity of massive volumes of phosphogypsum and process wastewater to vulnerable communities is an environmental injustice. African Americans are 75% more likely than other Americans to live in “fence-line” communities near industrial facilities, including those that produce hazardous waste, and are directly affected by the facilities’ operation.³³³ The injustice presented by phosphogypsum and process wastewater is made all the worse by the fact that the hazardous wastes stored near these communities are not currently managed in RCRA-permitted hazardous waste treatment, storage, and disposal facilities with strict manifest and land disposal requirements, but

320. LA. ADMIN. CODE tit. 33, §N.1 (2020).

321. U.S. EPA, *supra* note 193, at 15.

322. Idaho Department of Environmental Quality, *Design and Construction of Phosphogypsum Stacks: Docket No. 58-0119-2001*, <https://www.deq.idaho.gov/public-information/laws-guidance-and-orders/rulemaking/design-and-construction-of-phosphogypsum-stacks-docket-no-58-0119-2001/> (last visited Dec. 10, 2021).

323. REPORT TO CONGRESS, *supra* note 10, at 12-34 to 12-35.

324. SOFIA CARRATALA & CONNOR MAXWELL, CENTER FOR AMERICAN PROGRESS, HEALTH DISPARITIES BY RACE AND ETHNICITY (2020), <https://cdn.americanprogress.org/content/uploads/2020/05/06130714/HealthRace-factsheet.pdf>.

325. Marie S. O’Neill et al., *Health, Wealth, and Air Pollution: Advancing Theory and Methods*, 111 ENV’T HEALTH PERSP. 1861 (2003); Murray M. Finkelstein et al., *Relation Between Income, Air Pollution, and Mortality: A Cohort Study*, 169 CMAJ 397 (2003); Ariana Zeka et al., *Short Term Effects of Particulate Matter on Cause Specific Mortality: Effects of Lags and Modification by City Characteristics*, 62 OCCUPATIONAL & ENV’T MED. 718 (2005); American Lung Association, *Urban Air Pollution and Health Inequities: A Workshop Report*, 109 ENV’T HEALTH PERSP. (suppl. 3) 357 (2001).

326. National Cancer Institute, *Radon and Cancer*, <https://www.cancer.gov/about-cancer/causes-prevention/risk/substances/radon/radon-fact-sheet> (last reviewed Dec. 6, 2011).

327. U.S. EPA, *Publications About Radon*, <https://www.epa.gov/radon/publications-about-radon> (last updated Nov. 29, 2021).

328. National Emission Standards for Hazardous Air Pollutants; Radionuclides, 54 Fed. Reg. 51654 (Dec. 15, 1989).

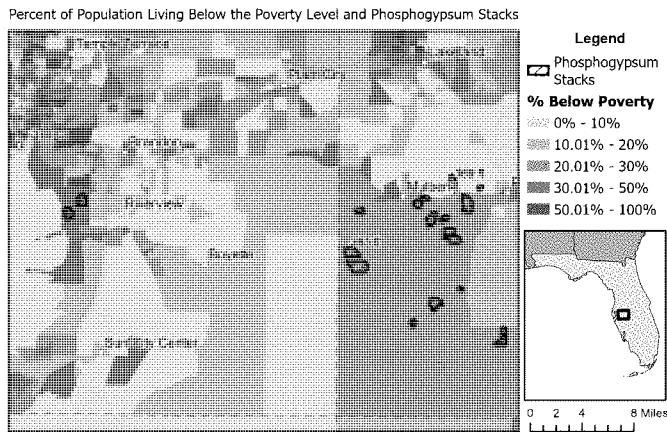
329. *Id.*

330. National Emission Standards for Hazardous Air Pollutants; National Emissions Standards for Radon Emissions From Phosphogypsum Stacks, 57 Fed. Reg. 23305 (June 3, 1992).

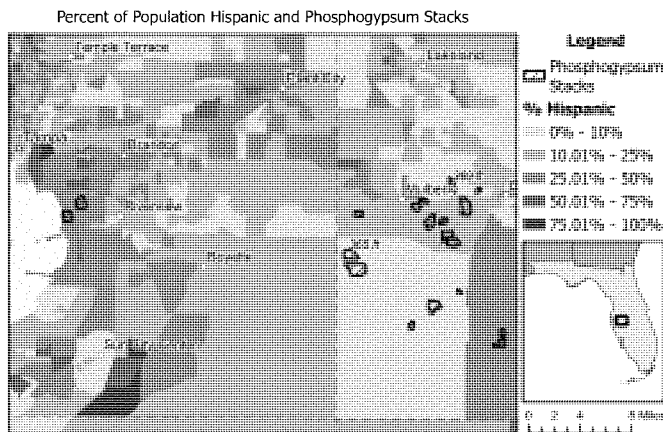
331. U.S. EPA, *supra* note 161.

332. *Id.*

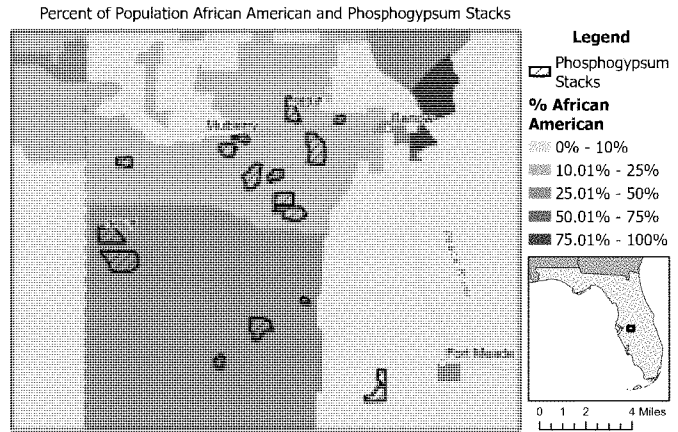
333. NAACP & CLEAN AIR TASK FORCE, FUMES ACROSS THE FENCE-LINE: THE HEALTH IMPACTS OF AIR POLLUTION FROM OIL & GAS FACILITIES ON AFRICAN AMERICAN COMMUNITIES (2017), <https://naacp.org/resources/fumes-across-fence-line-health-impacts-air-pollution-oil-gas-facilities-african-american>.

Figure 2. Percent of Population Living Below the Poverty Level and Phosphogypsum Stacks

Source: Map generated from ArcGIS, Find a Phosphogypsum Stack Near You, <https://center.maps.arcgis.com/apps/View/index.html?appid=a0cc8cbe12ea4ff9831822243b360766> (last visited Dec. 21, 2021).

Figure 3. Percent of Population Hispanic and Phosphogypsum Stacks

Source: Map generated from ArcGIS, Find a Phosphogypsum Stack Near You, <https://center.maps.arcgis.com/apps/View/index.html?appid=a0cc8cbe12ea4ff9831822243b360766> (last visited Dec. 21, 2021).

Figure 4. Percent of Population African American and Phosphogypsum Stacks

Source: Map generated from ArcGIS, Find a Phosphogypsum Stack Near You, <https://center.maps.arcgis.com/apps/View/index.html?appid=a0cc8cbe12ea4ff9831822243b360766> (last visited Dec. 21, 2021).

health testing conducted by the applicant,³³⁶ while Louisiana's Department of Environmental Quality rejected a similar proposal at the Uncle Sam facility due to health and safety concerns.³³⁷

For example, the active phosphogypsum stack at Mosaic's Riverview facility south of Tampa currently sits adjacent to the historically Black community of Old Progress Village (Progress Village). Progress Village was designed in the 1950s as a means to provide home ownership to Tampa's segregated Black residents, who lived primarily in housing projects and were purposefully displaced by construction of an interstate.³³⁸ The community learned in 1982 of then-owner Gardiner's plans to build a second phosphogypsum stack, this time across the street from Progress Village and near a school, and fought hard to stop the company from obtaining its necessary local permit.

Community members organized petitions and protests, and showed up in large numbers to several county commission meetings over the course of the next two years.³³⁹ At one meeting, a resident voiced:

What do you tell people 15 or 20 years from now when someone wants to know who let a company put two mountains of waste within the city limits of Tampa? How do you tell the next generation that we have messed up again? What do I tell my grandkids? Will their mother and father let them visit me? What do I do when I retire? I won't have the funds to move to the mountains or some resort area or take extended vacations in Europe. No, Mr. and Mrs. Commissioners. I'll be stuck with that gypsum pile the rest of my life. So, I appeal to you as God-fearing and law-

rather in underregulated open air stacks that emit radon and are prone to large-volume releases.

Mosaic Fertilizer installed four mechanical evaporators in 2019 at its New Wales facility in order to increase process wastewater evaporation and help maintain a negative process wastewater balance.³³⁴ However, Mosaic has been unable to determine the amount of process wastewater evaporated in this way due to "numerous operational and climatic inputs and outputs."³³⁵ The FDEP authorized the use of these evaporators through the national pollution discharge elimination system (NPDES) and Title V air permit modifications without reviewing any industrial

334. Notification of Completion of Construction—Spray Evaporator System, Mosaic Fertilizer, LLC—New Wales Facility, FDEP Permit #MMR_FL0036421 (Nov. 18, 2019).

335. Mosaic Fertilizer, LLC, Quarter 1 Spray Evaporation Report—New Wales Facility, FDEP Permit #MMR_FL0036421 (Apr. 28, 2020).

336. Personal Correspondence with Vishwas Sathe, Environmental Administrator, FDEP Phosphogypsum Management Program (Aug. 14, 2020).

337. Letter from Louisiana Department of Environmental Quality to Mosaic Fertilizer, LLC Re: Water Management Options at the Mosaic Fertilizer, LLC—Uncle Sam Facility (July 30, 2019).

338. Laura E. Baum, *Neighborhood Perceptions of Proximal Industries in Progress Village, FL 7-8* (2016) (M.A. thesis, University of South Florida).

339. *Id.* at 71.

abiding citizens. Please for one time give us a break. Let the little people win one. We already have an ammonia pipeline³⁴⁰ running through Progress Village that could burst anytime. We don't need to be subjugated to another hazard. Vote no against the gypsum pile proposal.³⁴¹

The “little people” did not win, and Hillsborough County commissioners approved the proposal in 1984.³⁴² Gardiner entered into an agreement with Progress Village leaders that year providing mostly short-term beautification benefits and a scholarship program.³⁴³ There is some dispute if the agreement was necessary to gain county approval for stack construction or if it was merely a side deal aimed at bettering community relations.³⁴⁴ Little remains of the benefits promised, but the growing radioactive, hazardous mountain will remain forever.³⁴⁵ EPA reports that within a three-mile radius, 60% of the population are “people of color” and 44% are low-income.³⁴⁶

Meanwhile, across the Gulf of Mexico, Mosaic Fertilizer's Uncle Sam facility is located in an infamous 85-mile stretch of industrial area in southern Louisiana containing 150 facilities, known as Cancer Alley due to its increased cancer rates when compared to the rest of the nation.³⁴⁷ The population of Convent, where the stack is located, is 62.20% Black, with average annual earnings of \$35,667.³⁴⁸ EPA reports that within a three-mile radius, 39% of the population are “people of color” and 29% are low-income.³⁴⁹

This community is now facing the consequences of an inadequately regulated stack system that has been permitted to grow too large and unstable given the weak nature of Louisiana soils noted by EPA three decades ago; the north slope of the facility's No. 4 phosphogypsum stack has been moving laterally since at least January 9, 2019. The state's review of the root cause determined that a five- to 10-foot zone of under-consolidated, interbedded weak organic and marine clay, ignored at the time of stack design, is at fault.³⁵⁰ In 1990, EPA considered Louisiana phospho-

gypsum stacks higher than 12 m (40 feet) to be unstable due to the weak nature of Louisiana soils.³⁵¹ Yet because of inadequate federal oversight, the Uncle Sam stack is now nearing 60 m (200 feet),³⁵² and is predictably unstable.

In response, Mosaic has been shifting its process wastewater inventory from the pond atop the stack to other nearby ponds in an attempt to both relieve pressure caused by the weight of the process wastewater on the northern slope and to mitigate the damage caused in the plausible event of a collapse and resulting release of process wastewater from the pond onto adjacent agricultural fields and the surrounding community. To date, however, the stack slope containing millions of gallons of process wastewater is still moving and threatening collapse.

These issues are not unique to the Southeast. In the 1980s, EPA discovered elevated levels of heavy metal in monitoring wells in the deep confined aquifer at the Simplot plant. EPA later classified the plant part of the Eastern Michaud Flats Superfund site near Pocatello, Idaho, though it was permitted to remain an active operating facility. The plant is the source of pollution of the nearby area, including Shoshone-Bannock tribal lands. EPA reports that within a three-mile radius, 37% of the people are low-income, and the Shoshone-Bannock Tribes of the Fort Hall Reservation are less than one-half-mile away.³⁵³

In May 2018 testimony to Congress on a bill regarding a land exchange, the chairman of the Shoshone-Bannock Tribe's Fort Hall Business Council said:

[J.R.] Simplot continues to process phosphates at its Pocatello Don Plant, which is located adjacent to the Reservation within our ceded lands where we have vested treaty property rights to hunt, gather, and graze livestock. . . . The EMF Site is a continuing source of chemical and radioactive contamination, introducing dangerous airborne, surface, and groundwater contamination into our ecosystem and into the regional ecosystem. Contaminants from the Site move off the private property boundary via groundwater and air and enter the Reservation, impacting our health, our land, and water resources. The groundwater moves generally north-northeast under the EMF Site, and discharges into springs and into the Portneuf River, which flows past the Simplot Don Plant and onto the Reservation. Thousands of mammals, reptiles and birds that have come into contact with the Site have died. The Site has also affected the Bottoms area, our sacred hunting grounds.³⁵⁴

340. The ammonia pipeline through Old Progress Village was constructed in the 1970s to transport ammonia from the port of Tampa to another fertilizer facility in Bartow, Florida. *Id.* at 65.

341. *Id.* at 72-73.

342. *Id.* at 74.

343. *Id.* at 75.

344. *Id.* at 73-74.

345. *Id.* at 97.

346. EPA Enforcement and Compliance History Online, *Detailed Facility Report—Mosaic Fertilizer LLC—Riverview*, <https://echo.epa.gov/detailed-facility-report?fid=110056968875#overEffReport> (last updated Dec. 6, 2021).

347. James Pasley, *Inside Louisiana's Horrifying “Cancer Alley,” an 85-Mile Stretch of Pollution and Environmental Racism That's Now Dealing With Some of the Highest Coronavirus Death Rates in the Country*, BUSINESS INSIDER (Apr. 9, 2020), <https://www.businessinsider.com/louisiana-cancer-alley-photos-oil-refineries-chemicals-pollution-2019-11>.

348. World Population Review, *Convent, Louisiana Population 2021*, <https://worldpopulationreview.com/us-cities/convent-la-population> (last visited Dec. 10, 2021) (Source: U.S. Census Bureau 2018 American Community Survey).

349. EPA Enforcement and Compliance History Online, *Detailed Facility Report—Mosaic Fertilizer LLC Uncle Sam Plant*, <https://echo.epa.gov/detailed-facility-report?fid=110006020215> (last updated Dec. 6, 2021).

350. Louisiana Department of Environmental Quality, *Uncle Sam Facility, Government Review of Root Cause Analysis* (Mar. 2, 2020).

351. REPORT TO CONGRESS, *supra* note 10, at 12-19.

352. Tom Wright, *Mosaic Says It Can Keep Wastewater on Site in Case of Breach*, LENS (Feb. 13, 2019), <https://thelensnola.org/2019/02/13/mosaic-says-it-can-keep-wastewater-on-site-in-case-of-breach/>.

353. EPA Enforcement and Compliance History Online, *Detailed Facility Report—JR Simplot Don Plant*, <https://echo.epa.gov/detailed-facility-report?fid=110000600421> (last updated Dec. 6, 2021).

354. *Hearing Before the Subcommittee on Interior, Environment, and Related Agencies of the House Committee on Appropriations*, 115th Cong. 386 (2018), <https://www.govinfo.gov/content/pkg/CHRG-115hhrg30858/pdf/CHRG-115hhrg30858.pdf> (statement of Nathan Small, Chairman, Fort Hall Business Council, Shoshone-Bannock Tribes).

The Shoshone-Bannock Tribes' heritage includes subsistence fish consumption; a high proportion of the diet of the Shoshone-Bannock Tribes consists of fish and shellfish, which accumulate toxins from polluted water.³⁵⁵ On August 12, 2020, the Bureau of Land Management approved the transfer of ownership of 719 acres of federal public land entirely within the Tribes' aboriginal and ceded territory and the Fort Hall Reservation to J.R. Simplot adjacent to Simplot's phosphogypsum stack.³⁵⁶ The Shoshone-Bannock Tribes of the Fort Hall Reservation have filed a lawsuit against the federal government challenging that land transfer.³⁵⁷

A study examining mortality over decades in a cohort of Florida phosphate fertilizer plant workers found significantly elevated mortality due to all causes, including all cancers, lung cancer, and leukemia as compared to the overall U.S. population and the population of Florida, as well as increased incidence of mental disorders and chronic obstructive pulmonary disease.³⁵⁸ Although an exposure-response relation could not be established due to limitations of the study, the authors noted that phosphate processing results in exposures to aerosolized radiation, acid vapors, and other airborne toxins.³⁵⁹ Radiation exposure routes to fertilizer plant workers and local residents near fertilizer plants include external radiation, inhalation and ingestion of radionuclide-containing dust, and inhalation of radon and radon daughters.³⁶⁰

To transport phosphate rock and phosphoric acid to and from fertilizer facilities, associated nearby phosphogypsum stack systems are often located in coastal areas of the Gulf. The Gulf region is particularly vulnerable to sea-level rise, with the highest rates of sea-level rise in the nation occurring from the mouth of the Mississippi River westward,³⁶¹ where several stacks are located. As seas continue to rise in the coming decades, many of the Gulf Coast stacks are likely to be catastrophically inundated.

On this backdrop of rising sea levels, coastal regions are threatened by increased flooding and intensifying storm surge, which in combination further threaten the integrity of coastal phosphogypsum stacks and future stack expansions. Coastal flooding is becoming more damaging as hurricane-generated storm surges grow more severe due

to climate change.³⁶² Projections anticipate an increase in the acceleration of sea-level rise in Florida,³⁶³ which when combined with intensifying hurricanes and storm surge is greatly increasing the flooding risk.³⁶⁴ Under a lower emissions Representative Concentration Pathway 4.5 scenario, storm surge is projected to increase by 25% to 47% along the U.S. Gulf and Florida coasts due to the combined effects of sea-level rise and growing hurricane intensity.³⁶⁵ The increasing frequency of extreme precipitation events is also compounding coastal flooding risk when storm surge and heavy rainfall occur together.³⁶⁶

Flooding concerns extend to those associated with high tide. Since the 1960s, sea-level rise has increased the frequency of high-tide flooding by a factor of 5 to 10 for several U.S. coastal communities, and flooding rates are accelerating in many Atlantic and Gulf Coast cities.³⁶⁷ A local sea-level rise of 1.0 to 2.3 feet would be sufficient to turn nuisance high-tide events into major destructive floods.³⁶⁸ In Florida specifically, which could have more than six feet of sea-level rise by the end of the century, nuisance flooding due to sea-level rise has already resulted in severe property damage and social disruption.³⁶⁹

The frequency, depth, and extent of tidal flooding are expected to continue to increase in the future.³⁷⁰ As the sea level rises, storm surge and tidal flooding will occur on an increasingly higher sea surface, which will push water further inland and create more flooding.³⁷¹ With water pushed further inland, not just during storm surge events, but also due to a general state of elevated sea level, areas once deemed suitable for phosphogypsum stack construction will no longer be so.

Climate change-driven and increasingly frequent, intense, and precipitous storms and hurricanes have already created major problems for phosphogypsum stack management, where maintaining design freeboard and surge capacity in process wastewater impoundments

355. Barbara Harper, SHOSHONE-BANNOCK EXPOSURE SCENARIO FOR USE IN RISK ASSESSMENT (2017), https://superfund.oregonstate.edu/sites/superfund.oregonstate.edu/files/shoshone_bannock_scenario_2017.pdf.

356. Bureau of Land Management National NEPA Register, DOI-BLM-ID-1020-2019-0008-EIS Documents, <https://eplanning.blm.gov/eplanning-ui/project/119626/570> (last updated Oct. 13, 2020).

357. Shoshone-Bannock Tribes of the Fort Hall Reservation v. Land & Minerals Mgmt., Dep't of the Interior, No. 4:20-cv-00553-BLW (D. Idaho Dec. 5, 2020).

358. James H. Yiin et al., *A Study Update of Mortality in Workers at a Phosphate Fertilizer Production Facility*, 59 AM. J. INDUS. MED. 12 (2016), <https://www.ncbi.nlm.nih.gov/pmc/articles/PMC4913354/>.

359. *Id.*

360. Kwang Pyo Kim et al., *Characterization of Radioactive Aerosols in Florida Phosphate Processing Facilities*, 40 AEROSOL SCI. & TECH. 410 (2006), <https://doi.org/10.1080/02786820600643313>.

361. Rebecca Lindsey, *Climate Change: Global Sea Level*, CLIMATE.GOV (Oct. 7, 2021), <https://www.climate.gov/news-features/understanding-climate/climate-change-global-sea-level>.

362. Katherine Hayhoe et al., *Our Changing Climate*, in 2 IMPACTS, RISKS, AND ADAPTATION IN THE UNITED STATES: FOURTH NATIONAL CLIMATE ASSESSMENT 72 (David R. Reidmiller et al. eds., U.S. Global Change Research Program 2018), https://nca2018.globalchange.gov/downloads/NCA4_Ch02_Changing-Climate_Full.pdf.

363. SEA LEVEL RISE AD HOC WORK GROUP, SOUTHEAST FLORIDA REGIONAL CLIMATE CHANGE COMPACT, UNIFIED SEA LEVEL RISE PROJECTION—SOUTHEAST FLORIDA (2019), https://southeastfloridacclimatecompact.org/wp-content/uploads/2020/04/Sea-Level-Rise-Projection-Guidance-Report_FINAL_02212020.pdf.

364. Christopher M. Little et al., *Joint Projections of US East Coast Sea Level and Storm Surge*, 5 NATURE CLIMATE CHANGE 1114 (2015).

365. Karthik Balaguru et al., *Future Hurricane Storm Surge Risk for the U.S. Gulf and Florida Coasts Based on Projections of Thermodynamic Potential Intensity*, 138 CLIMATIC CHANGE 99 (2016).

366. Thomas Wahl et al., *Increasing Risk of Compound Flooding From Storm Surge and Rainfall for Major US Cities*, 5 NATURE CLIMATE CHANGE 1093 (2015).

367. Hayhoe et al., *supra* note 362.

368. *Id.*

369. Shimon Wdowinski et al., *Increasing Flood Hazard in Coastal Communities Due to Rising Sea Level: Case Study of Miami Beach, Florida*, 126 OCEAN & COASTAL MGMT. 1 (2016).

370. Hayhoe et al., *supra* note 362.

371. Claudia Tebaldi et al., *Modelling Sea Level Rise Impacts on Storm Surges Along US Coasts*, 7 ENV'T RSCH. LETTERS art. 014032 (2012), <https://iopscience.iop.org/article/10.1088/1748-9326/7/1/014032/pdf>.

is critical to dam integrity and preventing large-volume releases to the environment.

Sinkholes occur when the sand, clay, shells, or other near-surface rock subsides or collapses into fissures and cavities in the underlying carbonic rock.³⁷² This happens when the carbonic rock that forms karst geography dissolves after coming into contact with acidic rainwater, surface water, or groundwater.³⁷³ Soluble rock underlies nearly 18% of the total area of the United States,³⁷⁴ but Florida—which has the most phosphogypsum stacks of any state—is also the most prone to sinkholes. For example, in 2012, Florida experienced a massive sinkhole event leading to hundreds of collapse-sinkholes across the state following record rainfall.³⁷⁵ Sinkholes are of particular concern in Florida for their direct effect on aquifer vulnerability and Florida's dependence on groundwater for its water needs.³⁷⁶

There have been major sinkholes underneath phosphogypsum stacks in Florida in the past few decades, releasing millions of gallons of untreated process wastewater and an undetermined amount of phosphogypsum into the Floridan aquifer.³⁷⁷ Remediation of contamination in the Floridan aquifer is likely not possible, as one study found “there is uncertainty in the fate of the contaminant waste after the sinkhole collapse.”³⁷⁸ Another study called for an improved understanding of karst processes and characterization of fast-moving conduit flow patterns.³⁷⁹ While these sinkholes released an alarming amount of phosphogypsum into subsurface waters, at least they were in known, discrete, isolated locations where a well-funded and technologically equipped company was responsible for mitigating the damage. No such outcome would be likely in the event of a sinkhole in a road containing phosphogypsum.

While still attempting to remediate the contamination caused by the 2016 sinkhole, the FDEP has authorized a 231-acre expansion of the same phosphogypsum stack.³⁸⁰ And remediation of contamination in the Floridan aquifer is likely not even possible, as one study found “there is uncertainty in the fate of the contaminant waste after the sinkhole collapse,”³⁸¹ and another study called for an improved understanding of karst processes and characterization of fast-moving conduit flow patterns.³⁸² In addition to these reported sinkholes, at least two unreported sinkhole-like “anomalies” occurred in 2004 and 2013 at the same New Wales facility, releasing undetermined

amounts of phosphogypsum and process wastewater to the aquifer below.³⁸³

Florida adopted its Phosphogypsum Management Rule in 1993, which established a performance standard based on the permitted zone of discharge.³⁸⁴ Stacks are required to be designed, operated, and maintained such that groundwater and surface water quality standards are not violated beyond the zone.³⁸⁵ The state has entered into numerous consent orders and corrective action plans for permit violations. For instance, after the 2016 New Wales sinkhole, where Mosaic Fertilizer violated its permit's vertical zone of discharge by discharging into the Floridan aquifer, the FDEP and Mosaic entered into a consent order directing the company to study methods and technologies to locate “zones of weakness, solution cavities, erosion features or other subsurface anomalies” that may cause sinkholes.³⁸⁶

B. Stack Owners Have Gone Bankrupt and Abandoned Their Facilities

Mulberry Phosphates, Inc. declared bankruptcy in February 2001, giving the FDEP approximately 48 hours' notice that it would abandon its Piney Point facility and that the phosphogypsum stack there was in need of continuous maintenance for which the corporation would be unable to provide any funding.³⁸⁷ The total process water and pore volume was 1.2 billion gallons when Mulberry Phosphates declared bankruptcy.³⁸⁸ Since each inch of rain that falls on the facility has been calculated to add approximately 12.5 million gallons of water to the process wastewater volume, a series of reasonably strong rain events adding 12 to 15 inches, or a 50- or 100-year storm, could overflow part of the berm and collapse the entire structure, releasing several million gallons of process water and some portion of the pore waters as a slurry and putting more than 60 homeowners in the immediate area in imminent danger of a spill.³⁸⁹

The state moved to assume receivership in bankruptcy proceedings, and was then forced to immediately discharge 50 million gallons of process wastewater after only single-lime treatment into adjacent Bishop Harbor.³⁹⁰ Single-lime treatment raises the process wastewater pH to 4.5 standard units and removes most of the metal constituents, but does not remove enough phosphorus or nitrogen to meet state or

372. FDEP, THE FAVORABILITY OF FLORIDA'S GEOLOGY TO SINKHOLE FORMATION 4 (2017).

373. *Id.* at 7.

374. Praveen Subed et al., *Sinkhole Susceptibility Mapping in Marion County, Florida: Evaluation and Comparison Between Analytical Hierarchy Process and Logistic Regression Based Approaches*, 9 SCI. REP. art. 7140 (2019).

375. *Id.* at 5.

376. *Id.*

377. *Id.*; see also *supra* notes 314-16 and accompanying text.

378. Sandu et al., *supra* note 304.

379. Sandu, *supra* note 304.

380. Ardaman & Associates, *supra* note 22.

381. Sandu et al., *supra* note 304.

382. Sandu, *supra* note 304.

383. NADIM F. FULEIHAN, INVESTIGATION OF 2013 ANOMALY NEW WALES PLAN CLOSED NORTH GYPSTACK (2013); REPORT TO CONGRESS, *supra* note 10, at 12-34 to 12-35.

384. FLA. ADMIN. CODE r. 62-673.340 (1993).

385. *Id.*

386. Consent Order, Florida Dep't of Env't Prot. v. Mosaic Fertilizer, LLC, OGC No. 1356 (Oct. 24, 2016).

387. Carl Henderson, Piney Point Phosphate Plant: An Environmental Analysis 40 (2004) (honors thesis, University of South Florida, St. Petersburg), <https://digital.stpetersburg.usf.edu/cgi/viewcontent.cgi?article=1062&context=honorstheses>.

388. Similar to process water in chemical composition, pore water is not ponded, but rather interspersed throughout the stack. *Id.* at 41.

389. *Id.* at 40.

390. *Id.* at 41.

federal water quality standards or to be discharged on even a limited basis to surface waters such as the poorly flushed Bishop Harbor.³⁹¹

While the state managed the site, it intentionally released 248 million gallons of partially treated process wastewater into the Gulf of Mexico via 35 barge trips from July 20 to November 30, 2003.³⁹² Between 2005 and 2009, the FDEP drained and lined the ponds atop the stack as part of a project to “reclaim” the stack for beneficial reuse. HRK Holdings acquired the stack in 2006 and allowed it to be used for deposition of dredge material from the adjacent Port Manatee expansion activities. This attempted beneficial reuse of a phosphogypsum stack has been an utter failure, resulting in multiple liner tears and releases into Bishop Harbor, with a 2011 leak sending 170 million gallons into Bishop Harbor.³⁹³ HRK Holdings informed local officials that the ponds are again nearing capacity, able to store only an additional 60 million gallons of water, or 19 inches of rainfall.³⁹⁴ In 2012, HRK Holdings filed for bankruptcy.³⁹⁵

Over Easter weekend 2021, the FDEP authorized the discharge of up to 480 million gallons of wastewater from one of the ponds. That water contained nitrogen, ammonia, phosphorus, and an undisclosed amount of heavy metals and radioactivity. The discharge fueled a red tide bloom in Tampa Bay that raged for more than one month and killed tons of marine life, including endangered and threatened species like the Florida manatee. On August 25, 2021, a court authorized the emergency appointment of a receiver, citing imminent harm and HRK’s inability to afford averting disaster.³⁹⁶

Mississippi Phosphates Corporation filed for Chapter 11 bankruptcy in December 2014, ceasing plant operations at the time and leaving more than 700 million gallons of process wastewater stored at the facility, with an additional nine million gallons generated for every one inch of rainfall.³⁹⁷ The bankruptcy settlement established a trust that was used to pay for process wastewater treatment overseen by the state, but the funds were depleted on February 10, 2017. EPA’s Emergency Response and Removal Program took control of the facility on February 11, 2017, and wastewater treatment is occurring at a rate of approximately 2,000,000 gallons per day at a cost to taxpayers of approximately \$1,000,000 per month.³⁹⁸

Groundwater beneath the plant is contaminated with arsenic, cadmium, lead, selenium, and thallium at lev-

els above EPA’s Safe Drinking Water Act (SDWA)³⁹⁹ maximum contaminant levels, and multiple city-owned groundwater wells are located within four miles of the site.⁴⁰⁰ Surface soil contains arsenic above screening values for site workers and elevated levels of cadmium, chromium, lead, nickel, vanadium, radium-226, radium-228, and associated decay products. Bayou Cossette sediment is contaminated with arsenic, chromium, and lead above screening values for the salt water environment.⁴⁰¹

C. EPA Must Regulate Phosphogypsum and Process Wastewater Under TSCA

Despite a preference for initiating prioritization for substances listed on the 2014 TSCA Work Plan for Chemical Assessments,⁴⁰² EPA retains discretion to initiate prioritization for substances not on the work plan, like phosphogypsum and process wastewater from phosphoric acid production, since TSCA regulations require only that 50% of the substances currently undergoing risk evaluation are drawn from the work plan. Because EPA indicated almost 30 years ago that phosphoric acid production wastes would be subject to a future TSCA regulatory program, EPA should now initiate their prioritization as high-priority substances under the Act.

Rather than study the toxicity, concentration of hazardous constituents at various U.S. phosphogypsum stacks, exposure, and other health and environmental effects relevant to an unreasonable risk finding, the majority of current, published phosphogypsum research is centered on potential commercial uses that are already banned by EPA under the NESHAP due to the risk of widespread radon exposure. With such misdirected science, many people living near a phosphogypsum stack may not even know what the substances in the stack are, let alone the risks to which they are being subjected. In this respect, the state-funded Florida Industrial and Phosphate Research Institute, which advocates for a reversal of the limited ban,⁴⁰³ might as well be a trade association.

Since the 1990 report to Congress, updated information on population-level exposure risks for radionuclide constituents and radon emissions for phosphogypsum stack systems is necessary, as the population within 80 kilometers of each phosphogypsum stack has likely greatly increased, as well as the number and size of the stacks themselves. Updated toxicity information using the toxicity characteristic leach procedure, which replaced the EP, is also necessary. Should EPA designate phosphogypsum and process wastewater as high-priority substances and conduct a risk evaluation, a testing rule under §4⁴⁰⁴

391. *Id.*

392. CHUANMIN HU & FRANK E. MULLER-KARGER, UNIVERSITY OF SOUTH FLORIDA, SATELLITE MONITORING OF THE FDEP GULF DISPERSAL OF THE PINEY POINT TREATED WASTEWATER 2 (2003).

393. Josh Salman, *HRK Knew of Tearing Problems Before Piney Point Spill*, BRADENTON HERALD (Sept. 25, 2012), <https://www.bradenton.com/news/business/article34551327.html>.

394. Craig Pitunan, *Phosphate Waste Threatens Bay Again, So What if We Bottled It?*, FLA. PHOENIX (Oct. 1, 2020), <https://www.floridaphoenix.com/2020/10/01/phosphate-waste-threatens-bay-again-so-what-if-we-bottled-it/>.

395. In re HRK Holdings, LLC, No. 8:12-bk-09868 (Bankr. M.D. Fla. filed June 27, 2012).

396. *Fortress 2020 Landco, LLC v. HRK Holdings*, No. 2020-CA-004459-AX (Cir. Ct. Fla. Aug. 25, 2021).

397. U.S. EPA, MISSISSIPPI PHOSPHATES CORPORATION SITE—PASCAGOULA, MISSISSIPPI FACTSHEET (2017), https://www.epa.gov/sites/production/files/2017-03/documents/mpc_fact_sheet_1_finalv2.pdf.

398. *Id.*

399. 42 U.S.C. §§300f to 300j-26, ELR STAT. SDWA §§1401-1465.

400. U.S. EPA, NATIONAL PRIORITIES LIST (NPL): MISSISSIPPI PHOSPHATES CORPORATION (2018), <https://semspub.epa.gov/work/HQ/197100.pdf>.

401. *Id.*

402. U.S. EPA, A WORKING APPROACH FOR IDENTIFYING POTENTIAL CANDIDATE CHEMICALS FOR PRIORITIZATION (2018), https://www.epa.gov/sites/production/files/2018-09/documents/preprioritization_white_paper_9272018.pdf; 40 C.F.R. §702.5(c) (2020).

403. See Florida Industrial and Phosphate Research Institute, *Phosphogypsum and the EPA Ban*, <https://fipr.floridapoly.edu/about-us/phosphate-primer/potential-phosphogypsum-use.php> (last visited Dec. 22, 2021).

404. 15 U.S.C. §2603.

will contribute to the development of information necessary to conduct the risk evaluation.

The need for a §4 testing rule is only further underscored should EPA find that there are not sufficient facts to warrant initiation of prioritization. Further, should EPA initiate prioritization but find that the development of new information is necessary to finalize a prioritization decision for phosphogypsum and process wastewater, EPA should exercise its authority under §4(a)(2)(B) to obtain that information and establish priority.

1. The Necessary Information Is Reasonably Available

To initiate prioritization, TSCA regulations require only that EPA believe information on relative hazard and exposure potential necessary to prioritize the substance is reasonably available. The information and findings in EPA's 1990 Report to Congress on Special Wastes From Mineral Processing and any supplemental analysis concerning the risks of phosphogypsum and process wastewater to human health and the environment are certainly reasonably available, and provide enough information on the risks of these substances to not only initiate prioritization, but also to make a high-priority designation based on the exposure potential and substantial hazard findings in that report alone, especially when considering that both the size of the stacks and exposed populations have greatly increased since 1990. Once EPA initiates the prioritization process, however, any information EPA has obtained or any findings EPA has made, including those in the 1990 report to Congress, concerning the costs to the industry of certain regulatory, management, or disposal alternatives, must not be considered under TSCA as amended by the Lautenberg Act.

2. EPA Has Already Determined That a Risk Management Regulatory Program Is Appropriate

Regulation of chemical substances under TSCA involves a three-step process: (1) evaluation of the substance's risk to human health and the environment, without consideration of costs; (2) a determination that the risk is unreasonable; and (3) promulgation of regulations necessary to minimize or manage the unreasonable risk posed by the chemical substance so that the risk is no longer unreasonable. EPA's 1991 Bevill determination not only exempted phosphogypsum and process wastewater from RCRA Subtitle C regulation, it also determined that a TSCA regulatory program was more appropriate, rather than a RCRA Subtitle D program or no regulation at all.⁴⁰⁵ Inherent to this determination that TSCA regulation is appropriate is an unreasonable risk determination. EPA's investigation of a TSCA regulatory program to manage phosphogypsum and process wastewater means these

substances not only may—but do—pose an unreasonable risk of injury to human health and the environment.

3. Other Federal Regulatory Programs Are Inadequate to Manage the Risk

Under TSCA §9, if a chemical substance's risk of injury to human health and the environment is managed effectively under a different statute, regulation under TSCA is not necessary. Section 9 also directs that if EPA determines that a risk to health or the environment associated with a chemical substance or mixture could be eliminated or reduced to a sufficient extent by actions taken under those other federal laws, EPA must use those other laws unless EPA determines it is in the public interest to protect against such risk by actions taken under TSCA.

With the exception of Subtitle C regulation under RCRA, from which phosphogypsum and process wastewater remain Bevill-excluded, other federal regulatory programs remain inadequate to manage the risk of injury to human health and the environment. EPA has concluded that the CWA's NPDES permitting requirements govern point source discharges to surface waters, but not groundwaters.⁴⁰⁶ The SDWA's regulations apply only to public water systems, with limited enforcement at the tap. And the CAA's NESHAP remains minimally protective for radon emissions, containing no prescriptive requirements other than the numerical radon flux standard tested once at the time of closure and imposing no pollution control technology.

4. Feasible Alternatives to Current Management Are Available

There are alternatives that EPA can explore after it fully evaluates the risk posed by these substances, including:

1. Taking advantage of the high mobility of metal and nonmetal ions in phosphogypsum when leached by implementing a closure technique where the entire stack is rinsed with a "clean" but non-potable water, the leachate collected, and treated⁴⁰⁷
2. Requiring new stack expansions like the 231-acre expansion planned for New Wales to have double geomembrane liners and leak detection leachate systems in place
3. Requiring facilities to use the hemihydrate wet process rather than the dihydrate process, because it produces fewer impurities in both the phosphoric acid product and phosphogypsum⁴⁰⁸

⁴⁰⁵ Special Wastes From Mineral Processing (Mining Waste Exclusion); Final Regulatory Determination and Final Rule, 56 Fed. Reg. 27300, 27316 (June 13, 1991).

⁴⁰⁶ U.S. EPA, INTERPRETIVE STATEMENT ON THE APPLICATION OF THE NPDES PROGRAM TO RELEASES OF POLLUTANTS FROM POINT SOURCES TO GROUNDWATER (2019), <https://nepis.epa.gov/Exe/ZyPDF.cgi/P1010111.PDF?Dockey=P1010111.PDF>

⁴⁰⁷ Carter et al., *supra* note 21, at 200.

⁴⁰⁸ PACIFIC ENVIRONMENTAL SERVICES, INC., BACKGROUND REPORT: AP-42 SECTION 5.11 PHOSPHORIC ACID 4, <https://www3.epa.gov/ttn/chief/ap42/ch08/bgdocs/b08s09.pdf>.

4. Requiring double-line treatment and reverse osmosis for stored process wastewater and stack leachate
5. Requiring a soil, synthetic, or artificial turf cover for inactive portions of stacks
6. Regulating the quality of phosphate ore mined, as the radioactivity of phosphogypsum is dependent on the radium content of the mined phosphate ore itself
7. Requiring phosphoric acid production limits to limit the amount of phosphogypsum generated

V. Conclusion

The damage already caused by phosphogypsum and process wastewater disposal is a consequence of this country's "most dramatic environmental regulatory loophole."⁴⁰⁹ EPA's failure

to establish specific regulations to control phosphoric acid production wastes as promised under either RCRA or TSCA is now more than 30 years running.

Given the substantial present and potential hazards to human health posed by these improperly managed wastes, especially in low-wealth and BIPOC communities, and EPA's stated commitment to environmental justice, EPA must reverse its Bevill regulatory determination for phosphogypsum and process wastewater and subject these hazardous waste mountains to RCRA Subtitle C regulations. Further, given the magnitude of potential exposure, EPA must begin the prioritization process for a phosphogypsum and process wastewater risk evaluation under TSCA §6 and issue a §4 testing rule to develop information with respect to health and environmental effects relevant to an unreasonable risk finding for disposed phosphogypsum, and a TSCA Significant New Use Rule under §5 for phosphogypsum used in road construction.

409. Jane Kloeckner, *Developing a Sustainable Hardrock Mining and Mineral Processing Industry: Environmental and Natural Resource Law for Twenty-First Century People, Prosperity, and the Planet*, 25 J. ENV'T L. & LITIG. 123, 131 (2010) (quoting *Oversight Hearing to Consider Whether Potential Liability Deters Abandoned Hardrock Mine Cleanup: Hearing Before the S. Comm. on Environment and Public Works*, 109th Cong. 70 (2006) (statement of Velma M. Smith, Senior Policy Associate, National Environmental Trust)).

An official website of the United States government.



You are here: Biennial Report Summary
=> 2023 Biennial Report Summary Results for National

2023 Biennial Report Summary Results for National

Criteria Name	Criteria Value
Location	National
Report Cycle	2023

The Biennial Report Summary provides the number of hazardous waste generators, managers, shippers, and receivers and the total quantity, in tons, of hazardous waste generated, managed, shipped, and received for the reporting year and State specified. The data is presented in alphabetical order by State Name, but may be reordered by clicking the column name of interest.

The individual sites that comprised the summary information may be ascertained in a number of ways. To see the quantity of hazardous waste generated, managed, shipped, and received for each individual site, click the State name (or National) of interest. To see individual sites engaged in a specific activity (i.e., generation, management, shipments, or receipts), click the quantity associated with the activity and State of interest. The individual sites that contributed to that specific activity will be listed.

69 items found, displaying 1 to 59.[First/Prev] 1, 2 [Next/Last]

Location Name	# of Genrs	Generated (Tons)	# of Mngrs	Managed (Tons)	# of Shprs	Shipped (Tons)	# of Recvrs	Received (Tons)
* NATIONAL *	18,731	32,219,747	804	35,376,446	18,602	6,278,457	451	6,028,906
ALABAMA	237	753,754	14	599,842	234	224,967	10	468,153
ALASKA	38	2,718	5	270	38	2,610	2	209
AMERICAN SAMOA	0	0	0	0	0	0	0	0
ARIZONA	181	82,753	8	5,938	178	87,541	8	8,436

3/4/25, 9:41 AM

USCA Case #25-1087Document #2105058Filed: 03/10/2025Page 460 of 472

2023 Biennial Report Summary Results for National | US Environmental Protection Agency

Location Name	Genrs # of	Generated (Tons)	Mngrs # of	Managed (Tons)	Shprs # of	Shipped (Tons)	Recvrs # of	Received (Tons)
ARKANSAS	458	391,674	21	578,622	451	259,243	5	301,101
CALIFORNIA	4,428	226,445	46	94,742	4,395	296,059	52	126,504
COLORADO	144	69,569	4	66,893	145	85,141	5	79,146
CONNECTICUT	278	32,612	10	12,134	277	32,099	6	11,793
DELAWARE	85	6,416	3	516	85	5,902	0	0
DISTRICT OF COLUMBIA	37	1,799	0	0	37	1,789	0	0
FLORIDA	375	62,592	20	28,751	376	48,558	16	14,545
GEORGIA	304	66,525	8	440	303	66,308	5	445
GUAM	8	221	1	2	8	170	1	91
HAWAII	39	544,648	2	544,063	38	561	1	24
IDAHO	43	6,412	3	30,994	43	9,126	3	32,140
ILLINOIS	707	315,025	18	364,962	704	180,585	17	225,005
INDIANA	468	862,215	36	1,251,054	462	397,492	11	645,924
IOWA	158	53,311	6	859	158	52,620	4	220
KANSAS	209	1,052,905	26	1,100,616	205	89,675	4	137,710
KENTUCKY	256	152,231	19	146,419	254	177,265	8	130,881
LOUISIANA	414	4,658,831	24	4,505,191	415	494,926	10	339,250
MAINE	105	2,545	3	76	106	2,628	2	2,110
MARYLAND	347	31,891	9	24,119	347	36,760	5	32,404
MASSACHUSETTS	538	46,166	8	4,034	537	66,924	8	17,565
MICHIGAN	503	319,789	19	323,835	501	335,475	22	339,496
MINNESOTA	280	143,133	22	109,849	277	40,548	10	6,322
MISSISSIPPI	330	1,263,267	7	1,185,536	324	96,048	2	19,228

APPX ATT_V4_1990

https://rcrapublic.epa.gov/rcrainfoweb/action/modules/br/summary/summarysearch;jsessionid=16A309D0D293A0414A090D315CE2D4AE5

2/4

Location Name	Geors # of	Generated (Tons)	Mngrs # of	Managed (Tons)	Shprs # of	Shipped (Tons)	Recvrs # of	Received (Tons)
MISSOURI	389	134,826	12	280,954	387	86,123	15	231,674
MONTANA	31	12,503	0	0	31	11,284	0	0
NAVAJO NATIONS	1	4	0	0	1	4	0	0
NEBRASKA	92	23,603	6	37,963	91	36,310	3	42,171
NEVADA	160	15,938	7	91,280	160	20,395	5	96,024
NEW HAMPSHIRE	155	3,990	2	37	155	3,736	0	0
NEW JERSEY	527	153,985	11	116,314	523	184,138	8	150,825
NEW MEXICO	81	4,923	5	1,745	82	7,917	4	4,614
NEW YORK	844	156,782	34	55,911	840	160,721	19	58,756
NORTH CAROLINA	427	113,997	10	13,270	427	129,532	11	26,040
NORTH DAKOTA	28	346,323	2	344,747	28	1,537	2	86
NORTHERN MARIANAS	0	0	0	0	0	0	0	0
OHIO	690	1,711,940	38	1,492,103	681	836,935	22	664,048
OKLAHOMA	200	91,455	14	256,701	199	85,918	8	250,733
OREGON	166	54,248	13	17,794	165	68,562	2	39,684
PENNSYLVANIA	765	216,892	34	311,167	768	189,228	21	292,472
PUERTO RICO	82	6,919	2	173	81	7,106	1	343
REGION 01 PURVIEW	0	0	0	0	0	0	0	0
REGION 02 PURVIEW	0	0	0	0	0	0	0	0
REGION 03 PURVIEW	0	0	0	0	0	0	0	0
REGION 04 PURVIEW	0	0	0	0	0	0	0	0
REGION 05 PURVIEW	0	0	0	0	0	0	0	0
REGION 06 PURVIEW	33	446	0	0	33	445	0	0

3/4/25, 9:41 AM

USCA Case #25-1087

2023 Biennial Report Summary Results for National | US Environmental Protection Agency

Document #2105058

Filed: 03/10/2025

Page 462 of 472

Location Name	# of Gensrs	Generated (Tons)	# of Mngrs	Managed (Tons)	# of Shprs	Shipped (Tons)	# of Recvrs	Received (Tons)
REGION 07 PURVIEW	0	0	0	0	0	0	0	0
REGION 08 PURVIEW	0	0	0	0	0	0	0	0
REGION 09 PURVIEW	3	55	0	0	3	55	0	0
REGION 10 PURVIEW	3	118	0	0	3	118	0	0
RHODE ISLAND	77	4,766	4	157	77	12,035	4	10,411
SOUTH CAROLINA	267	151,644	9	219,653	259	143,229	6	194,308
SOUTH DAKOTA	35	1,917	3	23	35	1,977	1	82
TENNESSEE	273	237,239	51	154,727	265	78,784	11	69,730

69 items found, displaying 1 to 59.[First/Prev] 1, 2 [Next/Last]

Export options: CSV | Excel | PDF

LAST UPDATED JANUARY, 2021

**STATE OF FLORIDA DEPARTMENT
OF ENVIRONMENTAL PROTECTION**

IN RE:

**HRK Holdings, L.L.C.'s (HRK)
a.k.a. Eastport Terminal**

OGC File No. 21-0323

EMERGENCY FINAL ORDER

Under Section 120.569(2)(n) of the Florida Statutes, and upon the following findings of fact, the State of Florida Department of Environmental Protection (Department) enters this Emergency Final Order (Order), including Findings of Fact and Conclusions of Law, in response to the imminent or immediate danger to the public health, safety, and welfare of the citizens of the State of Florida resulting from a potential breach in the liner at the Eastport Terminal facility.

FINDINGS OF FACT

1. HRK Holdings, L.L.C.'s (HRK) is responsible for operation of the closed phosphogypsum stacks at the former Piney Point facility, now operated as the Eastport Terminal facility (Facility or Site), located in Manatee County, Florida. HRK is authorized to manage operations at the Facility under the Department's Administrative Agreement FL0000124-003-AA (hereinafter "HRK AA"), as well as Administrative Agreement, OGC No. 06-1685, as amended, hereafter known as the Site Comprehensive Administrative Agreement (SCAA) and NPDES Permit No. FL0000124-003-AA. The HRK AA addresses the management of wastewater and stormwater at the Facility, via authorized outfall structures 001, 002 & 003, along with closure related operation and maintenance requirements. The SCAA addresses, among other provisions, HRK's long-term care obligations at the site, and prior approvals for use of three of the lined reservoir

compartments on top of the closed phosphogypsum stack for management and disposal of Port Manatee dredge material and clarification of transport seawater.

2. The 466 acre phosphogypsum stack system (hereinafter "System"), which includes the phosphogypsum stack with HDPE lined reservoir compartments discussed below, plus the south cooling pond system, north cooling pond system and associated lined stormwater ponds, was closed in 2010 based on the requirements for closing Systems under Chapter 62-673, Florida Administrative Code (F.A.C.). The top of the closed stack was constructed with various top gradient stormwater areas and four 80-mil HDPE lined reservoir compartments. Process water continues to be managed separately in the new gypsum stack north (NGS-N) lined reservoir compartment. The remaining three lined compartments only contained rainwater run-off prior to commencement of dredge operations and are designated as the: new gypsum stack south (NGS-S), old gypsum stack north (OGS-N), and old gypsum stack south (OGS-S) compartments. The OGS-S, OGS-N, & NGS-S compartments were subsequently used as an alternate disposal area for the management of dredge materials and for clarification of dredge decant water as authorized by Port Manatee Permit Modification No. 0129291-016-EM.

3. HRK and Port Manatee executed an April 19, 2007, Dredged Materials Containment Agreement to address their operating, maintenance and related responsibilities for the management of dredge materials, focusing initially on Port Manatee's then planned Berth 12 construction dredging project. The Berth 12 dredging project began on April 22, 2011, with HRK performing operational and monitoring requirements for dredge disposal operations at the Site. On May 11, 2011, HRK reported increased flows, conductivity, and chloride concentrations in the buried drains based on monitoring that was required specifically for the approved dredge disposal operations at the Site. Ultimately, the Department issued an Emergency Final Order (EFO No. 11-0813) that required HRK to take actions to protect the integrity of the stack system and its impoundments, and authorized controlled emergency discharges as needed to protect the integrity of the System, including its impoundments, and to protect public health and safety, and waters of the state from a potential catastrophic release. The site conducted emergency discharges of 169 MGal consisting primarily of dredged seawater with detectable process water constituents, and prevented an uncontrolled failure of the stack

system and its impoundments. HRK completed grouting and repair operations to the stack system and its impoundments by July 2011 so that the Port Manatee Berth 12 construction dredging project was then completed, and later completed repairs and cleanup operations for onsite areas and offsite drainage ditches that contained solids from the emergency discharge and turbidity from the dredged seawater.

4. The site currently has options for discharges from the site to both freshwater locations, and an additional discharge option to marine surface waters of the state. The freshwater discharge locations include outfalls 001 and 003, which are NPDES permitted discharge locations to freshwater drainage ditches and then to Bishop Harbor, a Class III Outstanding Florida Waterbody (OFW) in Tampa Bay; and 002 which discharges to Piney Creek which subsequently flows to Tampa Bay. The existing dredge related decant structures provide an additional discharge location that is used to transport seawater from prior dredging operations and subsequent rainfall for discharge into Class III marine surface waters at Berth 12 in Manatee Harbor.

5. On March 25, 2021, HRK reported increased flow and specific conductance (conductivity) measurements in the buried seepage interceptor drains that surround the System and flow to the Structure No. 1 pump station (Structure 1) at the Site. Based on HRK's information and a Department site visit conducted on the evening of March 25, 2021, it appears that increased flows and conductivity measurements may indicate the presence of a leak from the Site's NGS-S lined compartment. The NGS-S compartment contains about 480 million gallons (MGal) as a mixture of seawater and remnant process water from the historical fertilizer manufacturing operations at the site. HRK's reported information identifies the potential for a leak that may be developing likely in the NGS-S lined compartment, or elsewhere in the System. HRK and their third-party engineer are reviewing conditions at the site, to identify any response actions and repairs that may be necessary.

6. Since the March 25, 2021, report HRK has continued increased monitoring of the drain flow rates and conductivity, pH, and other parameters to characterize the drain flow at Structure 1 and at selected cleanout locations within the Site's drain system. The drain conductivity, pH, and other characteristics indicate that the drain flows contain elevated conductivity consistent with the introduction of seawater remaining in the NGS-S compartment from the 2011 dredge operation. The NGS-S also contains initial transfer of

72 to 107 MGal of process water that was transferred by HRK initially beginning in August 2012 from the NGS-N compartment to the NGS-S, followed by subsequent smaller transfers conducted as needed to ensure that the NGS-N had safe-storage capacities in the event of a hurricane or other seasonally expected extreme rainfall events.

7. Department inspections show that the quality of the mixture of seawater and process water in the NGS-S (Mixed Seawater) has moderated over time, now supporting fish, other aquatic organisms, and waterfowl that frequent the NGS-S compartment during at least the past five years. Department water quality results from the NGS-S compartment in 2019 and since indicate the presence of total dissolved solids, chlorides, and conductivity on the order of 14,000 mg/L, 5,900 mg/L, and 21,738 umhos/cm, respectively, indicative of the seawater from the 2001 Berth 12 construction project. The NGS-S also contains remnant fertilizer constituents including approximately 160 mg/L of total phosphorus and 230 mg/L of total nitrogen. The most recent pH results from the last seven days indicates that pH ranges from 4.7 to 5.3 s.u. in the NGS-S, which is below the applicable lower pH standard of 6.5 for marine waters. Total ammonia nitrogen (TAN) is above the marine Class III water quality standard assuming a pH less than 6.5 s.u., and expected water temperatures. The water quality for other trace constituents that were detected in the NGS-S Mixed Seawater were all below or within Class III marine water quality standards in Chapter 62-302, F.A.C. The process water in the NGS-N compartment also exhibits moderated characteristics consistent with aged process water including fertilizer constituents, with approximately 350 mg/L of total phosphorus and 310 mg/L of total nitrogen, and pH on the order of 4.8 s.u. However, the process water in the NGS-N compartment exhibits significantly less seawater influences from the 2011 dredge operations at the Site with total dissolved solids, chlorides, and conductivity on the order of 6,850 mg/L, 850 mg/L, and 9,273 umhos/cm, respectively.

8. HRK has explored options for removing process water from the NGS-N compartment, and for additional options for removing the Mixed Seawater from the NGS-S compartment at the Site, and currently operates a spray evaporation system to remove process water located in the NGS-N compartment. HRK is in the process of commencing a permitted discharge to the Manatee County Publicly Owned Treatment System (POTW), and that discharge is expected to recommence March 30, 2021, following replacement of a

faulty flow meter. Near-term but likely rate limited options for managing or removing water from the Site include seeking an increased POTW discharge once the performance of the currently permitted discharge is established and a determination is confirmed by Manatee County of the ability of its POTW to safely accommodate an increased discharge.

9. Other options identified by HRK and others for removing process water, including the Mixed Seawater from the NGS-S compartment were identified and summarized in the Department's updated October 1, 2020, summary memo on HRK Holdings LLC and Piney Point Long-term Care & Water Management. The identified options included a variety of treatment and surface water discharge technologies, treatment and underground injection control well disposal, as well as options for the resumption of the POTW discharge, and expanded spray evaporation systems, all of which would take time for implementation ranging from several months for some limited spray evaporation increases to those options requiring environmental permitting and onsite construction that could take from 6 to 24 months to implement.

10. Contingency measures at the site include the ability to transfer a limited portion of the 480 MGal of Mixed Seawater from the NGS-S to other lined areas at the Site. A Department review of the available contingency areas shows that there is relatively limited storage capacity, particularly when compared to the full quantity of Mixed Seawater in the NGS-S. The suitable existing lined contingency storage areas are those where control structures may be operated or installed to retain water. These contingency areas have initially estimated storage capacities of approximately 21, 28, 6, and 7 MGal, respectively in the following lined areas: Basin 2 stormwater pond, OGS-N compartment, NGS-N Relief Ditch, and the SCP Cap area. For these lined areas, the total volume of potential contingency storage capacity would be less than 65 MGal; however, their activation would increase the contaminated process watershed by 80 acres, or an increase in the process watershed catchment of approximately 70%. There may be other options for transfer of water from the NGS-S, or other System compartments if needed, where a similar industrial facility may be able to receive, store, and properly dispose of the mixture of seawater and process water; however, it is likely that even with expedited development of emergency or contingency options, that implementation of the necessary logistics for transfers to a suitable offsite location would take three weeks or more before the transfers could begin.

11. As of March 28, 2021, the drain flow rates and conductivity measurements at Structure 1 have remained elevated and the source of these changed conditions has not been identified. Given the uncertainty in the source of the increased drain flow rates and increased conductivity measurements at Structure 1, there are potential risks associated with each of the lined compartments currently storing process water or a mixture of seawater and process water, specifically including the process water in the NGS-N compartment and the Mixed Seawater in the NGS-S compartment. At the present time, the observations noted above are suspected to be from the Mixed Seawater in the NGS-S that appears to be at risk of pressurizing the buried drain system at the Site, and potentially causing System instability including uncontrolled boils in the lined stormwater ditches, south or west of the OGS-S or south and east of the NGS-S, or failure of the gypsum dikes or the earthen dikes that may result in an uncontrolled failure and discharge offsite, particularly along the exterior walls of OGS-S and NGS-S compartments.

12. HRK has taken and continues to take measures, which include increased monitoring and pumping from Structure 1 at the Site, monitoring water levels in System compartments, including the NGS-S compartment, and relieving head pressures from the System drains below the lined stormwater ditches, particularly adjacent to the south wall of OGS-S and NGS-S compartments.

13. The Department has determined that the condition described in paragraph 11 above, creates an imminent threat of a potential loss of containment and a catastrophic release of large amounts of seawater, mixed process water, and embankment materials, if immediate actions cannot be accomplished to reduce the volume of Mixed Seawater in or suspected to be leaking from the NGS-S, or loss of containment from other System compartments if occurring; and to prevent the accumulation of pressure within the drains and associated System components in the affected areas. A catastrophic release of Mixed Seawater, process water, and embankment materials from the System could result in personal injury or severe property and environmental damage.

14. The Department is entering this Emergency Final Order to protect human health and safety and to protect the environment from a potential catastrophic failure of the containment system at the Facility. Action is necessary to prevent loss of life, personal injury, or severe property damage.

CONCLUSIONS OF LAW

15. The Department is empowered to administer and enforce Chapters 373 and 403 of the Florida Statutes and the rules promulgated and adopted thereunder.

16. Based on the findings recited above, it is hereby concluded that the emergency caused by the potential breach in the liner system and the resulting conditions associated with Mixed Seawater in the NGS-S compartment, or process water primarily in the NGS-N compartment and elsewhere in the System, pose an immediate danger to the public health, safety, or welfare and requires an immediate order of the Department.

17. Under Sections 120.569(2)(n) of the Florida Statutes, the Secretary of the Department, or designee, is authorized to issue this Emergency Final Order.

ORDER

THEREFORE, IT IS ORDERED THAT:

18. HRK shall continue to take immediate emergency actions as necessary to ensure the stability of all System dikes, berms, and ditches to prevent a containment failure and catastrophic release of Mixed Seawater, process water and embankment materials. At a minimum, the HRK shall continue pumping and water management operations as needed to reduce or mitigate the potential development of pressures within the OGS-S and NGS-S wall and associated drain system; to eliminate or reduce potential impacts to the stability of the OGS-S and NGS-S stack walls and the OGS-S and NGS-S ditch embankments; to continue exploratory operations to locate, isolate, and repair as needed any potential liner breaches contributing to the conditions described in paragraph 11 herein, and to continue all feasible efforts to implement options for safely removing process water from the System, including any expedited efforts that may be needed to remove the Mixed Seawater from the NGS-S compartment and utilize the associated NGS-S decant water management system as needed to prevent a containment failure at the Site.

19. If HRK determines, based on recommendation of a third party registered professional engineer, that (1) the immediate emergency actions -described in Paragraph 18 above, along with other emergency actions to prevent destabilization of containment

structures within the System, are not adequate to contain Mixed Seawater within the NGS-S or process water in the NGS-N without a risk of a catastrophic release and (2) there is no feasible alternative, then HRK is hereby approved to first begin temporarily discharging the Mixed Seawater through the NGS-S decant structure to Class-III marine waters of the state at Port Manatee as a bypass pursuant to NPDES Permit No. FL0000124003-AA-. Such a bypass would potentially avoid an emergency discharge to Bishop Harbor, an Outstanding Florida Water. If the bypass does not alleviate the risk of catastrophic release, then as a last option, HRK is hereby may discharge via Outfall 003, or otherwise to any portion of the unnamed ditch along Buckeye Road or downstream of Outfall 003 that leads to Bishop Harbor so as to avoid or reduce the amount of an uncontrolled release that may otherwise result from a loss of containment and unpermitted discharge to surface waters of the state. The bypasses/discharges specified herein are hereinafter referred to as "Emergency Temporary Discharge." The Emergency Temporary Discharge shall be made solely to preserve the integrity of the System and shall be subject to the conditions further specified herein. Notwithstanding an Emergency Temporary Discharge hereunder, all feasible efforts to locate and repair as needed any liner breaches, or other sources of leakage within System containment areas shall be continued.

20. Prior to commencing an Emergency Temporary Discharge, HRK shall inspect all downstream conveyances to ensure no impedances exist that may cause adverse flooding or harm to public safety, health, welfare, or the property of others based on the expected range of emergency discharge flow rates. HRK shall notify the Department of the result of such an inspection of the downstream conveyances to Bishop Harbor, including any impedances that may cause adverse flooding impacts as noted above, prior to discharging to these conveyances. The Emergency Temporary Discharge shall be operated to reduce or not cause adverse flooding or harm to public safety, health, welfare, or the property of others. This discharge shall not cause adverse scouring to and excessive sedimentation of either Manatee Harbor or Bishop Harbor.

21. HRK shall provide a status report, at least once every 24 hours, during the effective period of this Emergency Final Order that shall include, at a minimum, the following information: 1) Number, location, capacity, and types of pumps operating for emergency purposes within the System; 2) Condition of the System containment including the south

walls of the OGS-S and NGS-S compartments, the earthen ditch embankments, and the System stormwater ditches and drains; 3) Location, condition and number of boils detected, if any; 4) Any other adverse condition within the System; 5) Response actions taken since the last status report; 6) Planned response actions for the upcoming or subsequent periods; 7) Estimated flow rates or ranges for any Emergency Temporary Discharge; and 8) Representative water quality data including turbidity, pH, and specific conductance, as measured for the Emergency Temporary Discharge.

22. HRK shall submit information required herein to the Department's Phosphate Management Program by electronic mail, or as otherwise directed, to the Tallahassee and Tampa area offices.

23. After any Emergency Temporary Discharge has ceased, HRK shall inspect the System, and any downstream conveyances to ensure no adverse impacts have occurred, or to propose any necessary corrective measures in the event of adverse impacts to public safety, health, welfare, or the property of others. If corrective measures are needed for any adverse impacts, HRK shall submit a detailed plan to correct these impacts to the Department within 30 days of cessation of the Emergency Temporary Discharge and shall implement such plan, as approved, within 15 days of Department approval. The System shall also be inspected by HRK's third party engineer to evaluate damage to its component portions, assess integrity of its containment dams and propose recommendations for corrective actions.

24. This Emergency Final Order shall take effect immediately upon execution by the Secretary of the Department or an authorized designee, and shall expire on April 30, 2021, unless modified, extended, or cancelled by further Order.

25. This Emergency Final Order does not preclude the Department from enforcing any criminal or civil liabilities which may arise under Florida law as related to matters herein, nor does it relieve HRK of the need to comply with applicable federal, state, or local laws, rules, or ordinances.

NOTICE OF RIGHTS

Pursuant to Section 120.569(2)(n) of the Florida Statutes, any party adversely affected by this Order has the right to seek an injunction of this Order in circuit

court or judicial review of it under Section 120.68 of the Florida Statutes. Judicial review must be sought by filing a notice of appeal under Rule 9.110 of the Florida Rules of Appellate Procedure, with the Clerk of the Department in the Office of General Counsel, Mail Station 35, 3900 Commonwealth Boulevard, Tallahassee, Florida 32399-3000, and by filing a copy of the notice of appeal accompanied by the applicable filing fees with the appropriate district court of appeal. The notice of appeal must be filed within thirty days after this Order is filed with the Clerk of the Department.

DONE AND ORDERED on this 29th day of March, 2021, in Tallahassee, Florida.

FLORIDA DEPARTMENT OF
ENVIRONMENTAL PROTECTION



John J. Truitt
Deputy Secretary, Regulatory Programs
3900 Commonwealth Boulevard
Tallahassee, Florida 32399-3000

FILED on this date, pursuant to §120.52 Florida Statutes, with the designated Department Clerk, receipt of which is hereby acknowledged.



CLERK

DATE: March 29, 2021